JOCKEY'S RIDGE

STATE PARK dare county, n.c.

prepared by:

The State of North Carolina
Department of Natural and Economic Resources
Division of Parks and Recreation
The Master Planning Unit
July, 1976

JOCKEY'S RIDGE
MASTER PLAN

Foreword

The primary objective in preparing a master plan for Jockey's Ridge Park is to provide a development plan and program compatible with the nature of the site. It is essential that the plan be unified physically and in such a way that administrative services and operations can be provided efficiently.

In addition, the master plan speaks to the optimum carrying capacity of the site for all of its proposed activities and facilities with respect to the maintenance of the desired park character. It remains a flexible plan inasmuch as development need not reach its final phase if follow-up analysis indicates expansion is undesirable. Development is contingent upon the availability of funding and the establishment of biennial statewide priorities. A review of the impact of site development and visitor use should be conducted after each development phase, insuring long range protection of the natural resource.

As a matter of policy, the same principles which were used as a basis for the development of this plan — for governing the establishment, extension, and development of the State Park System — should be used in making decisions which affect the welfare of Jockey's Ridge State Park.

CONTENTS

INTRODUCTION **2**
- Jockey's Ridge State Park 3
- History 4
- Existing Uses 10
- Visual Impact of Jockey's Ridge 11
- Recreation in the Region 12
- State Park Principles 14

PHYSIOGRAPHY **16**
- Topography 17
- Geology and Ground Water 17
- Surface Water 21
- Soils and Vegetation 21
- Climate 25
- Development Limitations 25

MASTER PLAN **26**
- Acquisition and Development 27
  - Protection 27
  - Public Access 27
  - Hiking 31
  - Park Office and Maintenance Area 31
  - Hang Gliding 33
  - Model Plane Soaring 33
  - Visitor Center 34
  - Park Residences 34
  - Services to Park Users 34
- Park Management 36
- Interim Facilities 36
- Development Phasing and Utilities 38
- Personnel 39

BIBLIOGRAPHY **41**

INTRODUCTION

JOCKEY'S RIDGE STATE PARK

On a summer morning in 1973, Walter and Carolista Baum heard the noise of a bulldozer on the sound side of Jockey's Ridge. Upon investigation, they found this earth moving machine grading an area at the base of the highest sand dune (110.5') in the eastern United States. The first reaction to the destruction was a feeling of sorrow and helplessness by those observers. For years, many local public and private groups had talked of protecting the big dune from encroaching development from the seashore community of Nags Head; however, no appreciable steps towards preservation had ever been taken.

This feeling of resignation was soon replaced by a new determination to make one last effort to save the Dune. Their first action was bold and decisive. "Carolista marched up to the bulldozer, planted herself in its path, and declared that she would not move until the operator shut the machine down."[18]. He did so; and from this point on, a new determined effort to "Save Our Sand Dune" was initiated.

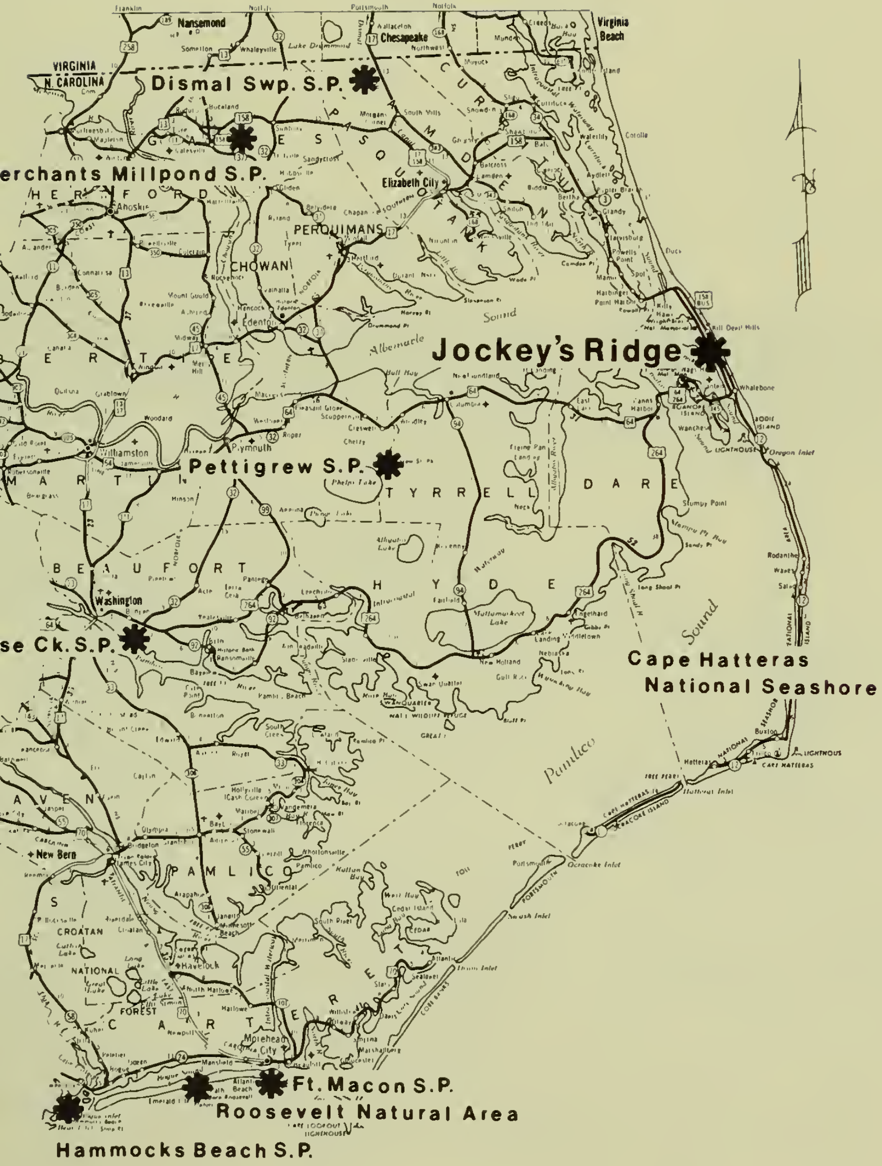
A petition was written and circulated, and within a few days, approximately 25,000 signatures were collected. Personal appeals for help were made to the local governments of Nags Head and Dare County, to various state government officials, and to prominent citizens. Carolista appeared before the Board of Conservation and Development to appeal for a State Park designation for the threatened Dune. The Board agreed to study the question, and requested Thomas Ellis, Director of State Parks, to prepare a report on park feasibility for Jockey's Ridge.

In the meantime, "People to Preserve Jockey's Ridge" was organized and Carolista Baum was elected President. The organization sold "T-shirts, balloons, phonograph records, kites, and bumper stickers — all bearing the dune preservation message." With money earned from these enterprises, the 15-minute motion picture about Jockey's Ridge was produced and circulated throughout the State.

In October of 1973, a favorable report from State Parks was presented to the Parks and Recreation Committee. At this meeting, a 500-acre acquisition proposal was described as the minimum area needed to preserve Jockey's Ridge, a "living and moving dune." The motion carried to accept the report.

By this time, the U. S. Department of the Interior approved the Dune for inclusion in the National Registry of Natural Landmarks; and with favorable recommendations by the Department of Natural and Economic Resources and strong support from various public and private groups, the 1975 General Assembly appropriated $500,000 for the specific purposes of acquiring land at Jockey's Ridge.

With this appropriation and matching funds from the U. S. Bureau of Outdoor Recreation, the State of North Carolina began purchasing property, approximately 152 acres. In addition, the Nature Conservancy purchased property north of the Dune, and dedicated it to the State in 1976 for the original purchase price. Presently, 266.8 acres of Jockey's Ridge are owned by the State, and approximately 150 acres are needed to complete the original proposal. People to Preserve Jockey's Ridge is actively assisting the State's efforts by acquiring options on the remaining property, and by raising additional money for acquisition.



HISTORY

One of the features which attracts vacationers to Nags Head are the large sand dunes, always referred to locally as the "hills" or "ridges". These include Run Hill, the Round-About Hills, Scraggly Oak Hill, Graveyard Hill, and Jockey's Ridge, all north of Nags Head. Engagement Hill, Pin Hill, and the Seven Sisters are found to the south. Of course, Jockey's Ridge is the largest, tallest, and the most imposing.[23]

Jockey's Ridge is located in the northeastern corner of Dare County on the Bodie Island, or "Outer Banks", a barrier island across the Croatan and Roanoke Sounds. The site, between the U.S. 158 bypass and the Roanoke Sound, is approximately 10 miles east and north of Manteo, and is within the corporate limits of the Town of Nags Head, North Carolina.

The history of Jockey's Ridge spans four centuries. Long before the first European settlers, the Algonquian Indians lived and used the Banks. Evidence indicates that the Indians may have had semi-permanent settlements. The Barrier Islands such as Bodie were in seasonal use without long occupation. Surveys conducted on and around the Ridge produced no artifacts.

From the first sighting by Spanish and French explorers the Ridge has been a landmark to mariners. One of the first historical references to the Ridge is a grant to John Campbell dated 1753 in which it was referred to as "Jockey's Hill". The Ridge became a popular excursion to the visitors and summer residents of Nags Head when it became a popular resort.

"In the early 1800's Nags Head began to develop as a summer resort community. In the early 1830's a Perquimans County planter in seeking a refuge for his family from the dreaded "chills and fever" (malaria), which was common on the mainland, purchased a large tract of land just above where the old "Roanoke Inlet" had once been and constructed a summer home on it.".[23]

Several of the planter's friends and relatives would visit during the summer season and it was not long before other summer homes were being built in the area. The resort community continued to grow and by 1838 it was decided that there was a definite need in the area for a public house to provide entertainment and lodging for visitors to the Banks. A hotel which could accommodate 200 guests was built among the larger dunes halfway between Roanoke Sound and the Atlantic in the same vicinity of the earlier summer homes.

Although the only practical means of travel to and from Nags Head was by boat, the community continued to grow as a resort. By the mid 1800's Nags Head, with its big hotel, featured "name" bands and was frequented by notable visitors.

In 1851, the editor of the American Beacon was impressed with "the most celebrated and remarkable ridge of sand called "Jockey's Ridge" of very great elevation, sharp and thickly wooded two-thirds of its length and extending near to the ocean shore."[23]

The Ridge has always been associated with legends of pirates, ghosts and Indians. It was said of Jockey's Ridge that "the lady who may accompany you to its summit if not already a wife will shortly become yours." There was also a story of the disconsolate lover who had climbed to the top of the hill, intent on self-destruction:

> But when he came near
> Beholding how steep
> The sides did appear
> And the bottom how deep;
> Though his suit was rejected
> He sadly reflected
> That a lover forsaken
> A new love may get;
> But a neck that's been broken
> Can never be set.

With the coming of the Civil War, this period of growth was soon to end. In early 1862, the Confederate Army moved into Nags Head taking over the hotel as command headquarters. When Nags Head fell, the hotel was set ablaze by the retreating confederates so as to render it useless to the enemy. After a War, a new hotel was built and it appeared that Nags Head was once again to become a popular family resort. This brief period of revival succumbed to the post-war reconstruction and depression; and by 1890 there were hardly any remains of the once flourishing resort.

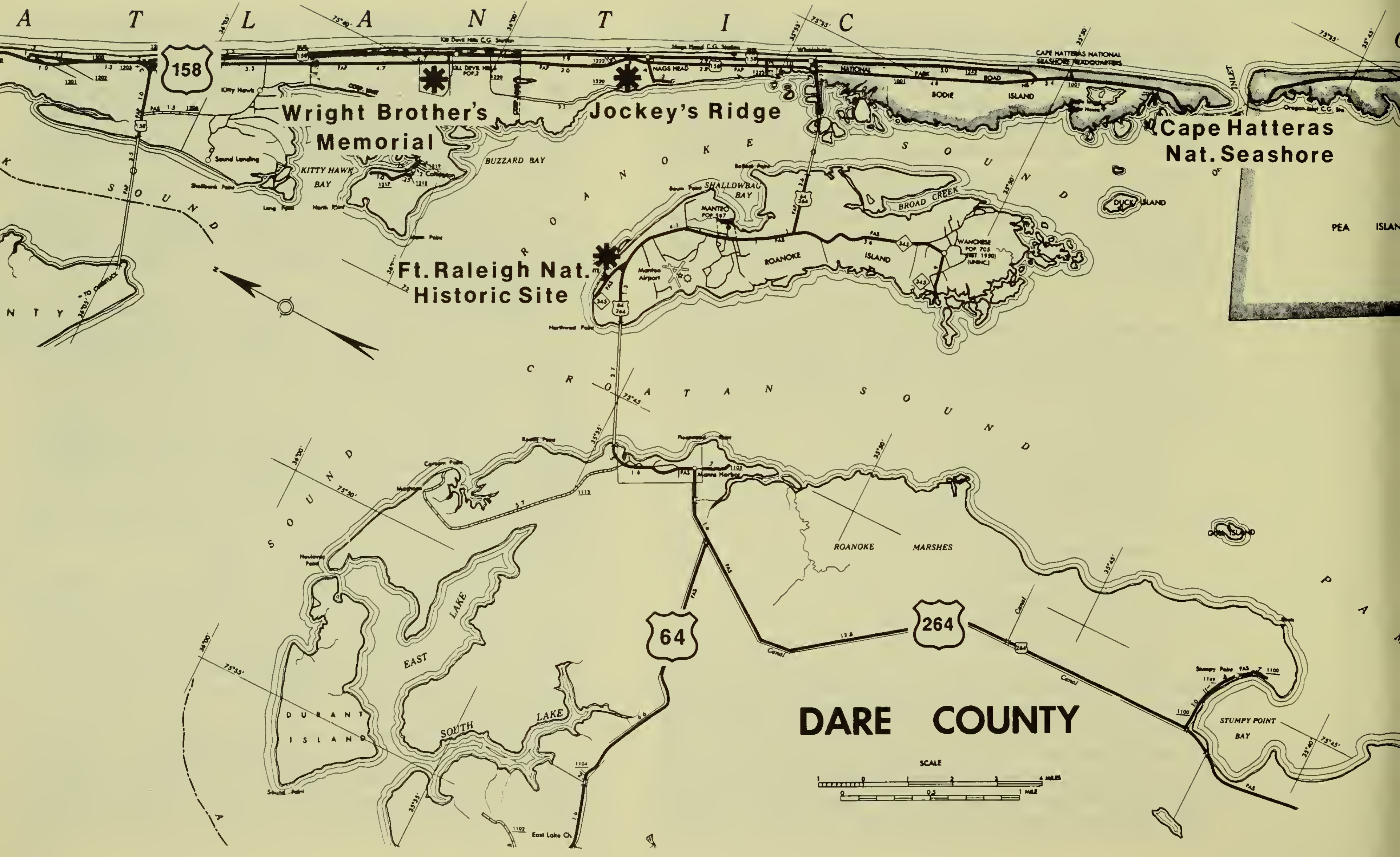
It is somewhat ironic that the isolation which had made Nags Head attractive as a resort eventually became the major factor which slowed further development. In the early 1900's there were still no bridges to connect the Banks with the mainland. Tourists still had to travel by water, which often resulted in lengthy delays.

By the turn of the century, "Old Nags Head" had been replaced by a new community on the ocean side. The dwellings which were not destroyed by fire in "Old Nags Head" were eventually consumed by the massive shifting sand dunes of Jockey's Ridge.

The effects of World War I and the Great Depression of the late 1920's was severely felt among Dare County residents. There were fewer tourists than ever and the outlook for the future did not hold any better promises. In 1934 a group of Dare County citizens tried to convince the State Highway Commission of the need for bridges and roads connecting the Banks with the mainland. Although their efforts with the Highway Commission were to no avail, they later pushed through the issuance of long-term county bonds for the construction of a bridge between Roanoke Island and Nags Head. Total cost was approximately $140,000 and in 1928 the new bridge connecting the Island with the Banks was in general use.[10]

About this same time a group of Elizabeth City businessmen formed the Wright Memorial Bridge Company and constructed a bridge across Currituck Sound from a point just north of Kitty Hawk. The Wright Memorial Bridge was completed in 1931 and shortly afterwards the State Highway Commission constructed an 18-mile long sand-asphalt highway along the beach connecting the two bridges.

In 1931 construction was begun on the Wright Memorial at Kill Devil Hill and regular ferries were operating between Roanoke Island and Mann's Harbor and across Oregon Inlet. However, a nationwide depression had arrived and unemployment had reached a high point on the Banks. In addition, many


ATLANTIC
158
Wright Brother's Memorial
Jockey's Ridge
Cape Hatteras Nat. Seashore
Ft. Raleigh Nat. Historic Site
KITTY HAWK BAY
BUZZARD BAY
ROANOKE SOUND
SHALLOWBAG BAY
MANTEO
BROAD CREEK
ROANOKE ISLAND
WANCHESE
BODIE ISLAND
NAGS HEAD
KILL DEVIL HILLS
CAPE HATTERAS NATIONAL SEASHORE HEADQUARTERS
NATIONAL PARK ROAD
DUCK ISLAND
PEA ISLAND
Manteo Airport
CROATAN SOUND
ROANOKE MARSHES
EAST LAKE
SOUTH LAKE
DURANT ISLAND
64
264
STUMPY POINT BAY
DARE COUNTY
SCALE
East Lake Ch.

areas of the beach were badly eroded, and at Cape Hatteras the shore had been cut so badly that the lighthouse was threatened by the sea.

Economic development slowed, and did not resume until the late 1930's. By the summer of 1941 new hotels and tourist cottages at Nags Head were doing a big business, lot sales showed a marked increase, and attendance at "The Lost Colony" pageant and the Wright Memorial were at an all-time high. In addition, the first national seashore recreational area had been authorized for the Banks, and considerable land, including Cape Hatteras, had been acquired for the park. However, in December of 1941, the Japanese attacked Pearl Harbor, bringing the United States into war, and Nags Head returned to economic inactivity.

The beach development potential, made possible with the opening of the bridges and other facilities, had been held up first by depression and then by war. By the summer of 1946, new hotels, motels, restaurants, stores and cottages were open for business at Nags Head, and many more were being planned. Land prices rose steadily as new real estate developments were opened, and tourists poured across the bridges in throngs.[10]

Although many persons by this time assumed that the Cape Hatteras Seashore Recreational Area project was dead, an anonymous donor, later identified as two foundations established by the children of Andrew W. Mellon, offered in June of 1952 to give $618,000 for the purchase of park lands if the State of North Carolina would provide matching funds. Four days later the State appropriated the funds and the park became assured. Cape Hatteras National Seashore made the town a more attractive vacation center for the major tourist services — food, lodging, and auto service.

Under pressure from local citizens and businessmen, a series of bridges were constructed, one across Croatan Sound in 1957, another across the Alligator River in 1961, and the last across Oregon Inlet in 1963. Completion of the Oregon Inlet Bridge made nearly the entire length of the National Seashore easily accessible by motor vehicle.

Since then, Nags Head has experienced a phenomenal surge in both residential and commercial construction. Although mostly residential, a great increase in the construction of commercial and recreational facilities has been realized. Intensive hotel/motel development followed U.S. 158 along the oceanfront; and the construction of the U.S. 158 Bypass opened the back part of the dune area to further residential development.[10]

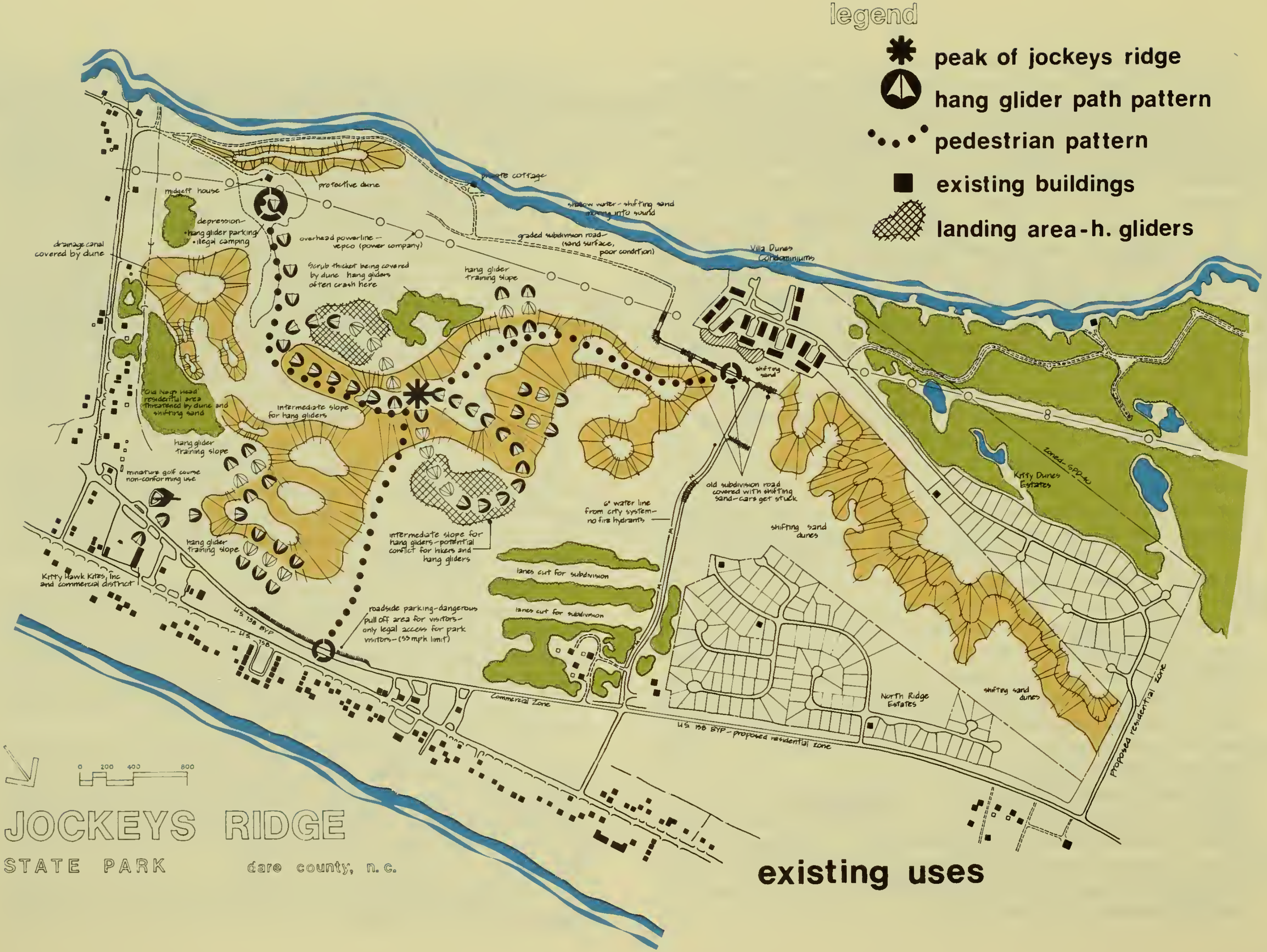
The area immediately surrounding Jockey's Ridge fell into this category of newly developing residential land. The Town of Nags Head zoned the land residential and four developments were initiated north of Jockey's Ridge. Vista Harbour was the development that nestled around the northern end of the Ridge. Before development was halted, a spine road for the subdivision was constructed from the entrance off the U.S. 158 Bypass to the back side of the Ridge.

Several summer and permanent residences are located between Vista Harbour and the U.S. 158 Bypass. State Park land surrounds the property, and access is provided by the Vista Harbour entrance. A six-inch water line that connects with the town water supply was installed along the subdivision road during the period of road construction.

The Villa Dune Condominium project was also constructed on the northern end of Jockey's Ridge. Fifteen multifamily units, an access road from U.S. 158 Bypass, and a waste water treatment plant were constructed. Several units in the development are experiencing sand erosion from the Ridge, and in an attempt to alleviate the situation, American beach grass has been planted by the developer.

Along the access road to the Villa Dunes, a subdivision named Kitty Dune Estates is being developed. Lots have been subdivided for sale, and water and electrical power are available. However, the asphaltic road is experiencing severe deterioration; apparently it was not built to N. C. Highway Divison standards.

The remaining residential development, North Ridge Estates, also has residential lots for sale. The roads are paved,


legend
peak of jockeys ridge
hang glider path pattern
pedestrian pattern
existing buildings
landing area - h. gliders
midgett house
protective dune
private cottage
shallow water - shifting sand moving into sound
depression - •hang glider parking •ilegal camping
drainage canal covered by dune
overhead powerline - vepco (power company)
graded subdivision road - (sand surface, poor condition)
Villa Dunes Condominiums
Scrub thicket being covered by dune hang gliders often crash here
hang glider training slope
shifting sand
"Old Nags Head" residential area threatened by dune and shifting sand
intermediate slope for hang gliders
hang glider training slope
miniature golf course non-conforming use
hang glider training slope
Kitty Hawk Kites, Inc and commercial district
intermediate slope for hang gliders - potential conflict for hikers and hang gliders
roadside parking - dangerous pull off area for visitors - only legal access for park visitors - (55 mph limit)
US 158 BYP
US 158
6" water line from city system - no fire hydrants
old subdivision road covered with shifting sand - cars get stuck
shifting sand dunes
lanes cut for subdivision
lanes cut for subdivision
Commercial Zone
Kitty Dunes Estates
Zoned - SPD-40
North Ridge Estates
shifting sand dunes
US 158 BYP - proposed residential zone
Proposed residential zone
0 200 400 800

JOCKEYS RIDGE

STATE PARK

dare county, n. c.

existing uses

utilities provided, and three homes have been constructed. Access is from the Bypass, and the western boundary of the development borders Park property.

The remaining developments around the Ridge consist of a strip commercial zone along the bypass and an old residential area, 'Old Nags Head', to the south. The strip development along the Bypass that is adjacent to the Park is composed of several commercial establishments, a gasoline station, a miniature golf course, and a small number of small single-family cottages. The hamburger stand at the intersection of the Bypass and SR 1221 and the adjacent miniature golf course are nonconforming uses in the SPD-20 zoning classification. SPD-20 is a special planning district intended for "low density planned-unit residential development, providing open space and recreational uses in sections not suitable for residential uses."[2] This classification expressly prohibits commercial and industrial use of the land, and was designed to "preserve unique natural phenomena including sand dunes, coastal forests, and other natural features of environmental concern."[2] State park land is included in this classification.

Old Nags Head is one of the oldest residential areas on Bodie Island. It is located on SR 1221, locally known as the Old Sound Side Road. It ran behind Jockey's Ridge, through the backside of Nags Head Woods, to an old fishing village which has since been abandoned. The homes along SR 1221 were originally protected from Jockey's Ridge by a coastal forest; however, through the years, the Ridge's southwesterly movement has reduced the size and quality of the forest to a shrub thicket. The drainage canal that was built to remove ponded surface water from the area has been breached by the Ridge in one place. At least one house is experiencing sand accumulation on its rear facade. In addition, the easternmost section of the Ridge is moving sand onto the miniature golf course and the U.S. 158 Bypass. Periodic road maintenance is required to keep this section of highway open during the year.

EXISTING USES

Though the Ridge was actually owned by private landholders, it has always been considered part of the public domain. Vacationers and beach residents continued to enjoy the Ridge as had others for centuries. On a calm summer day, it is not uncommon to see hundreds of people climbing to the summit.

Access to the Ridge is provided along the bypass by a 30-space roadside pull-off that was built by the North Carolina Department of Transportation. Visitors park here and immediately climb the Ridge. During the summer months, the pull-off is usually completely full from early in the morning until late in the evening. Even people strolling along the beach cross U.S. 158 and the Bypass to hike to the summit of Jockey's Ridge. Free or unrestrained access to the Ridge appears to be the accepted use pattern.

However, this situation has several obvious problems. First, the roadside parking area is the cause of many accidents during the summer months. Even with a seasonal speed limit of 45 mph, cars reduce their speeds far below the limit in order to pull into the parking area. Cars that do not stop unconsciously slow down to take a quick glance at Jockey's Ridge. Exiting the parking area is also very difficult. In several spots, the site distance required for the motorist trying to accelerate into traffic is insufficient. A 300 to 400-foot view of the highway is needed for a 45 mph speed limit, and a view of approximately 100-150 feet is currently available.

Secondly, merchants across the Bypass from the Ridge are becoming weary of providing toilet facilities for Jockey's Ridge visitors. Heavy visitation during the summer has already overburdened their parking and sanitary facilities. Many people use the parking lots and bathrooms designated for customer use.

During periods of its recent history, the Ridge has been subjected to various recreational fads. Jeep races on the lower elevation of the Dune were popular in the 1950's. Parachutists have occassionally used the Ridge as a target for their jumps; and model plane soaring enthusiasts still launch their planes from the peak of the Ridge.

Radio-controlled model soaring gliders are kept in the air by the rising air currents produced by winds blowing over the hills. The dunes at Nags Head are the only hills within a 200-mile radius with sufficient height, slope, and wind condition to be suitable for soaring. Conditions are best when the wind velocity is 10-15 mph from the northeast or southwest. The wind blows up the steep slopes of the dune, and the peak of the ridge makes an ideal launching point for the models. Most slope soaring is done within 200 yards of the dune, and on a good day, a pilot can control a model from a quarter of a mile away. Models will soar at altitudes of 50 to 200 feet above the peak of the Ridge, and therefore do not interfere with other activities around the dune. The pilot can land his model almost anywhere, but the safest place is on the level ground on the lee side of the Ridge.

Most pilots prefer to fly individually or in a small group of 3 or 4 when conditions are favorable. However, the variable nature of the winds prohibits the Ridge from being used on a regular basis by the model soaring clubs in the area. The Tidewater Model Soaring Society of Hampton Va., and the District of Columbia Radio Control Club are affiliated with the National Soaring Society, and are the only clubs within a weekend's drive of Jockey's Ridge. The National Society has 1450 members, and the Tidewater Club has approximately 15 active members.

The newest and one of the most interesting sports to use Jockey's Ridge is Hang Gliding. This activity also relies on the southwestern and northeastern winds which dominate the Ridge year around. Glider Pilots take-off into the wind from the peak of the Ridge and glide to the foot of the Ridge, relying on the aerodynamic design of the kite and on their own skill to safely complete the flight. Each flight takes a minimum of 15 seconds, and the record for soaring is one hour and 15 minutes.

According to hang glider pilots, Jockey's Ridge is a most forgiving dune. Rarely have any injuries of a serious nature occurred, injuries are mainly turned or twisted ankles and bruised elbows. Soaring from the highest peak can be negotiated by pilots who can take off unassisted, control their air speed, and then make a stand-up landing (Hang I) in a steady wind of 10-15 mph. Once the wind exceeds 15 mph or gusty conditions are present, a more experienced pilot is required to handle the kite.

The lower levels of the dune are good training slopes for beginners and for pilots trying to gain experience. On a clear spring or summer day with ideal winds between 10-15 mph, groups of hang gliders can be seen soaring the Ridge. The same wind conditions and dune formations that attracted Orville and Wilbur Wright to Kill Devil Hill also attracts hang gliding pilots to Jockey's Ridge. Five to ten hang gliders can be expected when weather conditions are good. Pilots from all over the eastern seaboard fly at the Ridge.

To enhance the hang gliding activities, a hang gliding school, Kitty Hawk Kites, Incorporated, was established across from the Ridge on U.S. 158 Bypass. The shop gives lessons and sells hang gliders and other accessories. Each spring the Outer Banks Chamber of Commerce and Kitty Hawk Kites sponsors a Gliding Spectacular for 50 pilots. This event is an annual display of expert hang gliding, new equipment, and new teaching techniques.

VISUAL IMPACT OF JOCKEY'S RIDGE

The character of the Outer Banks can be seen first from the bridge that connects the mainland and Roanoke Island on U.S. 64. Wright Brother's Memorial and the adjacent sand dune on Bodie Island can easily be seen from the bridge, an eight-mile distance. Jockey's Ridge can be seen from the bridge that connects Roanoke and Bodie Island, a distance of 5 miles. Both views are very scenic, and they effectively illustrate the scale of the coastal sand dunes.

In the immediate area, Jockey's Ridge is an extremely impressive land form on the landscape. The Ridge can easily be seen two miles away by travelers on the U.S. 158 Bypass, and is distinguishable landmark from the sound and the ocean.

However, the most impressive views are of Bodie Island from the pinnacle of Jockey's Ridge. Wright Brother's Memorial and the Town of Kill Devil Hills can be seen to the north, and to the south Nags Head and the remainder of Bodie Island can be viewed. The sunrises and sunsets from the pinnacle are beautiful, and the views at night of Nags Head and Kill Devil Hill are very scenic. Star gazing is always a favorite pastime for late night visitors of the Ridge.

RECREATION IN THE REGION

Nags Head and Kill Devil Hills contain over twenty miles of sandy ocean beach and nearly ten miles of coastline along Roanoke Sound. The area, Roanoke and Bodie Islands, serves as the entrance to the Cape Hatteras National Seashore which extends fifty miles south of the Pamlico Sound. Through the years, Nags Head and Kill Devil Hills have traditionally been family resorts, however, more and more facilities and accommodations are being provided for the general vacationing public. Bodie Island is reached via U.S. 64 and U.S. 264 from the west and U.S. 158 from the north. Daily highway counts average 5,000 vehicles on U.S. 158 and the bypass. However, they do not reflect the high seasonal visitation figures during the summer months of June, July, and August. During this summer season, 90 percent of the tourists surveyed at Nags Head traveled 100 miles or more to vacation there. Over 12 percent came from parts of Virginia, and smaller percentages came from South Carolina, Kentucky, Tennessee, and New Jersey.

By far, the most popular activities on the coast are swimming, fishing, boating, camping and visiting scenic attractions. To accommodate these uses, seventy percent of all urban land uses in Nags Head have developed for motels, hotels, and other commercial and residential land uses. The commericial developments are primarily tourist oriented with restaurants, gift shops, entertainment facilities and gasoline stations. Eight fishing piers and three marinas have been developed, and eight other public boat ramps exist within a one-hour drive of Nags Head. Overnight camping facilities are readily available on Roanoke and Bodie Island. Approximately 1,800 campsites have been developed by private sources for public use. An additional 700 campsites are provided in the Cape Hatteras National Seashore on Hatteras and Ocracoke Islands. Other recreational facilities in the area include four 18-hole golf courses, 3 miniature golf courses, and two amusement parks.

The Federal Government has taken a leading role in preserving the seashore and in providing recreational facilities. In addition to managing Hatteras and Ocracoke Island and providing 700 campsites, the National Park Service manages the Pea Island National Wildlife Refuge, the Fort Raleigh National Historic Site, and Wright Brother's National Memorial.

A visitor center and formal garden are located at Fort Raleigh, and every summer the Roanoke Island local Historical Association presents Paul Green's symphonic drama, 'The Lost Colony' in the outdoor amphitheater. The play dramatizes the attempts to colonize Roanoke Island in 1587.

To commemorate the Wright Brothers, a museum and monument were built at the location of their 1903 flights. A replica of their aircraft is on display inside the museum, and the monument is located at the pinnacle of Kill Devil Hill. Yearly visitation averages 300,000 to 400,000, with the heaviest totals being registered in the summer months of June, July, and August.

Altogether, Cape Hatteras National Seashore attracts over two million visitors every year. Most of these travelers come from over 100 miles away, and can be expected to stay in the area several days. Because of its location in Nags Head, Jockey's Ridge will receive heavy day use by vacationers. Uncounted numbers of people visit the Ridge now; and when convenient access and other facilities are provided, visitation should equal or exceed that of the Wright Brother's Memorial. On the average, the National Seashore's visitation increases from 10 to 15 percent every year. If this trend continues, Jockey's Ridge can expect approximately 400,000 visitors when full time operation begins and close to 500,000 visitors by the year 1980.

Public Meetings: In order to include the general public in the master planning process, two public meetings were held on April 7, and May 24, 1976 at the Nags Head Town Hall. The purpose of the meetings was to solicit public response concerning the provision and management of potential uses or activities for Jockey's Ridge State Park.

The first meeting was attended by approximately 50 people. Many activities were suggested for the park plan, and everyone agreed that the Ridge should be preserved as a State Park. Most people wanted the Ridge left in its present state, a live, shifting sand dune. Many local residents were against limiting pedestrian access to park property or designating specific locations for trails on the Ridge. Several residents wanted State Parks to provide a new parking area and sanitary facilities at the Ridge, and to remove the roadside parking on the U.S. 158 Bypass. Hang gliding and model plane soaring were also suggested as park activities, however several year-round residents felt that hang gliding should not be provided if it conflicted with hikers on the Ridge.

At the second meeting, two development alternatives were presented. The majority of the 50 people that were present favored the plan that included a new parking area, toilet facilities, a park office/maintenance area, and a park visitor center. Activities such as hiking, hang gliding, and model plane soaring were included in the recreational program.

During the time from April to June, the Division received many letters from interested citizens, groups, and businesses supporting the development of Jockey's Ridge State Park. The Towns of Nags Head and Kill Devil Hills also supported park development, and the Town Commissioners of Nags Head rezoned potential park property to protect it from further development.

STATE PARK PRINCIPLES

The purpose of the North Carolina Park System shall be to serve the people of North Carolina and their visitors by:

1. Preserving and protecting natural areas of unique or exceptional scenic value not only for the inspiration and benefit of the present generation, but, also for generations to come.
2. Establishing and operating state parks that provide recreational use of natural resources and outdoor recreation in natural surroundings.
3. Portraying and interpreting plant and animal life, geology, and all other natural features and processes included in the various state parks.
4. Preserving, protecting and portraying scientific sites of statewide importance.

General Principles

To assure the accomplishment of this basic purpose in accordance with the best standards, state park sites of the North Carolina State Park System shall be limited to:

1. **State parks** which evaluated on a state-wide basis, possess unique or exceptional scenic value.
   By exceptional scenic value is meant rare natural scenery, which is unlikely to be preserved for the benefit and enjoyment of the public in this and future generations if the property remains in private ownership, and which is sufficiently distinctive to attract and interest people from distinct parts of the State as well as local people.
2. **State parks** which possess distinctive scenic values and excellent opportunities for the development of facilities for active recreational use of natural resources and excellent opportunites for the study of natural history. A state park site (other than scientific sites) should possess both scenic and recreational values. In some sites exceptional scenic values may be sufficient to overcome the lack of recreational possibilities, and in other sites unusual recreational possibilities may make up for a lack of scenic values. By unusual recreational values is meant features such as topography, trees, vegetation, streams, lakes or ocean shore offering recreational possibilities which would attract and interest people of a wide surrounding area and would not be available to the public if the property remained in private ownership.
   The state parks should be sufficient in number, size, development, operation and maintenance to adequately serve the needs of all of the people of the State over and above the facilities which are or should be provided by local city, town and county parks.

Size Requirement

Every state park site shall be of sufficient size to:

1. In the case of state parks possessing unique or exceptional scenic value:
   - (a) completely include the scenic or natural features the area is established to protect and preserve;
   - (b) provide sufficient buffer area to protect the scenic or natural features from outside influences or encroachments;
   - (c) provide a reasonably satisfactory habitat for indigenous wildlife; and
   - (d) permit the development of recreational and public use areas if these can be provided without damage to or impairment of the primary purpose of preserving the scenic or natural fea'ures, and if geographical location or public need justify development of such areas. Under normal conditions, 400 acres of land well adapted to state park use and development shall be considered as a minimum size for each state park site possessing unique or exceptional scenic values.

2. In the case of state parks possessing distinctive scenic values and excellent recreational opportunites:
   - (a) completely include the distinctive scenic features of the area and, if possible, one or more complete landscape units;
   - (b) provide sufficient buffer area to protect the distinctive scenic features from outside influences or encroachments.
   - (c) provide a reasonably satisfactory habitat for indigenous wildlife;
   - (d) amply accomodate the recreational and public use developments required to meet present and future public needs and to accommodate these developments in such a way that various types of public use will not interfere with each other or destroy the effect of a natural environment; and
   - (e) provide extensive use amid unspoiled and relatively unmodified natural surroundings. Under normal conditions, 400 acres of land well adapted to state park use and development shall be considered as a minimum size for each state park site.

Development

State parks possessing unique or exceptional scenic value shall receive only such development as is necessary to protect and preserve the scenic and natural values, provide public access, protect public health and provide adequate interpretive programs, and the development of such other recreational and public use facilities as can be provided to meet justifiable public needs without damage to or impairment of the scenic and natural values. All developments shall be planned and executed so as in no way impair, damage or detract from the scenic or natural values which the areas were established to preserve and protect.

State parks possessing distinctive scenic values and excellent opportunites for the development of facilities for active recreational use of natural resources shall receive all development required to protect and preserve the distinctive scenic values, provide public access, protect public health, provide recreational use of natural resources and provide adequate interpretive programs. Development for public use of natural resources shall primarily include facilities for such outdoor activities as picnicking, swimming, boating, fishing, hiking, nature study and camping, and for vacation use when desirable.

PHYSIOGRAPHY

TOPOGRAPHY

Jockey's Ridge is an active dune system, and is the highest such dune system in the eastern United States. The height of the land surface at Jockey's Ridge ranges from sea level at the ocean and sound to approximately 110 feet at the top of the ridge itself. The average height is only 20 feet at the most, with much of the Outer Banks in this area below that.

The top elevation of Jockey's Ridge is impossible to exactly determine due to the nature of the dune itself. Variable wind speeds and directions are constantly changing the shape and height of the dune, while the general overall location has remained fairly stable.

Examination of aerial photographs taken since 1949 has shown that the physical appearance and location of Jockey's Ridge have not drastically changed since that time. But it is also apparent that the dune is in no state of equilibrium. The peaks shift position on the dune in response to wind variations. The prevailing winds in the area are southwesterly from March through August, and northeasterly from September through February, meaning that the winds are roughly equal and balanced throughout the year. This would seem to account for the back-and-forth movement of the ridge evident from the aerial photographs, and also its apparent ability to remain within the same fluctuating boundary year-to-year with only slow southwesterly movement.

The U.S. Department of Housing and Urban Development has delineated three different levels of flood hazard boundaries around Jockey's Ridge. The first level is the 100-year flood probability and has been set at an elevation of 9 feet above mean sea level. The 10-year flood frequency elevation is 2.5 feet lower than the 100-year elevation, making it 6.5 feet above mean sea level. Two other zones have also been established; the first is the 500-year flood probability and the second is all the land above that elevation.[27]

GEOLOGY AND GROUND WATER

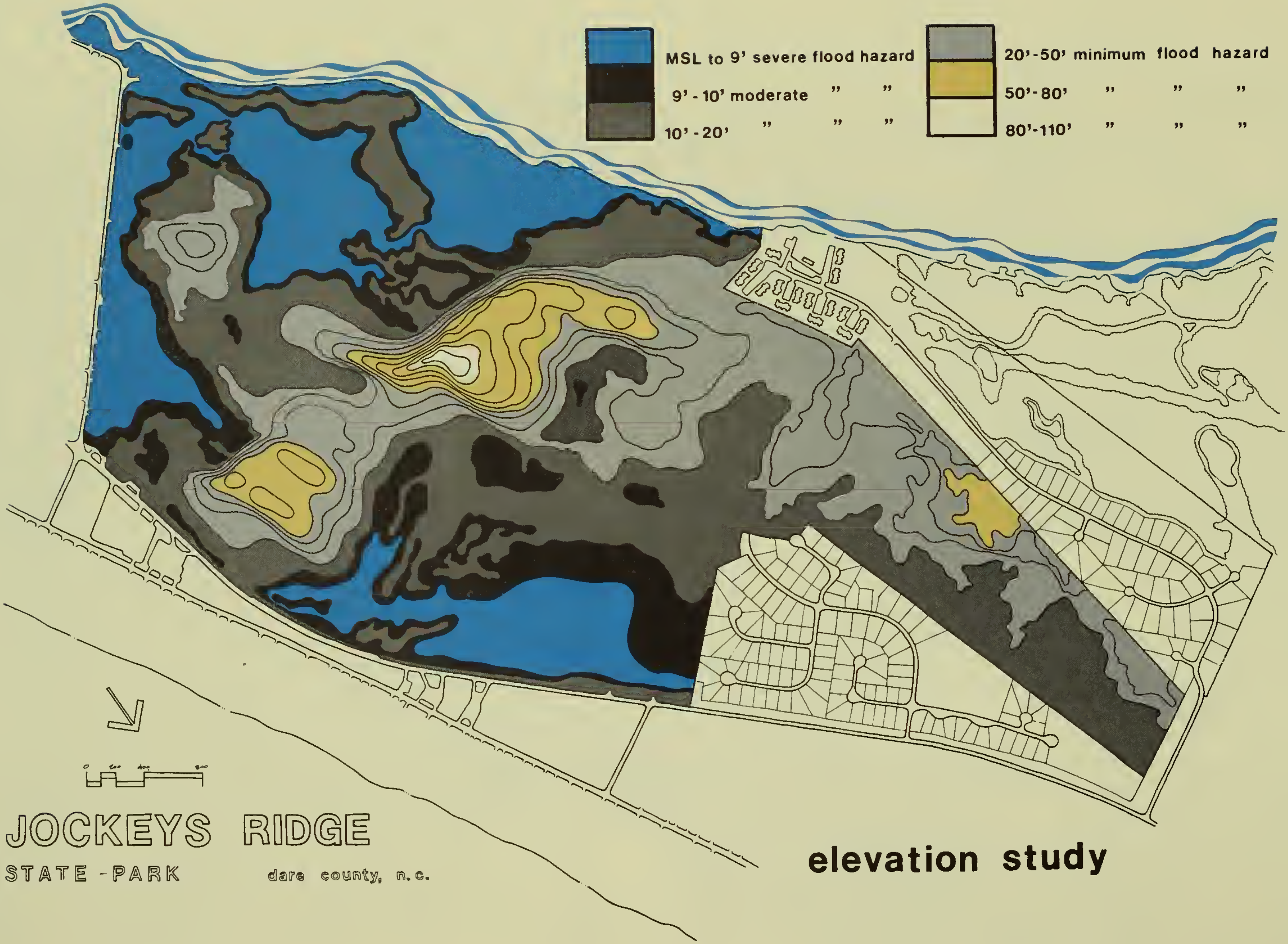
The Outer Banks originated, in its present form, as a result of the last glaciation. Prior to glaciation, the sea level was approximately 25 feet higher than at present. As the glacier formed and moved southward, sea level dropped about 300 feet along the Outer Banks. At full glacial time, a continuous coastal plain was exposed from Florida to Cape Cod. Among Present-day North Carolina, this "shelf" was ninety miles wide; as the ice melted, the sea level rose and flooded what is now known as the Continental Shelf. The greater part of the Outer Banks was created during this post by local erosion of sediments by onshore waves.[4]

Exploratory wells penetrated six significant hydrogeologic units above a depth of 500 feet at Kitty Hawk. These units include three aquifers and three confining beds or aquitards.

The uppermost unit is a water-table or "unconfined" aquifer consisting primarily of sand with some shells and some thin interbedded clays and silty sands. This aquifer extends from the land surface to depth ranging from about 30 feet below sea level at Manns Harbor to about 60 feet at Kitty Hawk. Because of the beds of clay and silty sand, the water is confined at some localities and depths. This aquifer is the source of water for municipal wells at Manteo and many other domestic and commercial wells in the area. It may be a significant reservoir for recharge to the underlying confined aquifer in some parts of the area.

The water-table aquifer is underlain by a layer of clay and interbedded clay and sand that ranges in thickness from about 35 feet to more than 100 feet. This unit is the confining bed for the uppermost confined aquifer, which appears to be the most significant aquifer in the area.

The top of the principal aquifer ranges from about 65 feet below sea level at Manns Harbor to about 200 feet at Kitty Hawk. The aquifer consists of fine to coarse, but predominately medium-grained sand with some shell fragments and some clay


MSL to 9' severe flood hazard
9' - 10' moderate " "
10' - 20' " " "
20'-50' minimum flood hazard
50'-80' " " "
80'-110' " " "
JOCKEYS RIDGE
STATE - PARK
dare county, n.c.
elevation study

lenses. The upper part of the aquifer grades into clayey sands or clay, so that the aquifer at Nags Head is only about 45 feet thick.

Another clay layer lies beneath the principal aquifer, separating it from the lower confined aquifer. The top of the confining bed ranges from about 175 feet to 230 feet below sea level, and the thickness ranges from about 60 to more than 100 feet.

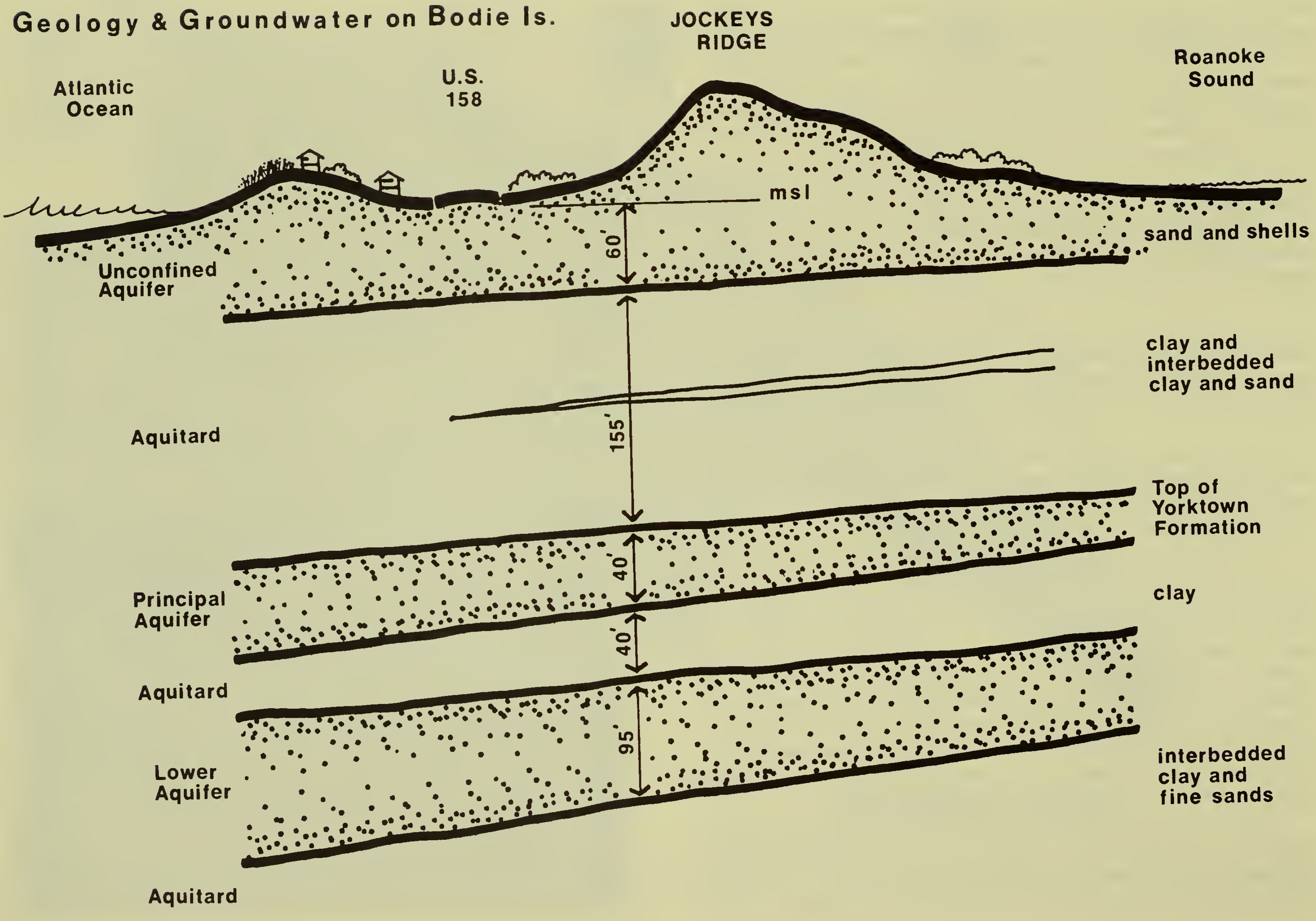
The top of the lower confined aquifer ranges in depth from about 240 to 300 feet below sea level, and in thickness from about 90 to about 150 feet. The aquifer is a fine to medium-grained sand with interbedded clays and some shells. The data indicate that the permeability of the aquifer decreases with depth. This aquifer is not used as a source of water supply in the area.

The lower aquifer is underlain by a unit consisting of interbedded clay and fine sands of relatively lower permeability, which is generally considered as a "non-aquifer". This unit ranges in depth from about 315 feet to about 400 feet below sea level.

The principal aquifer has been shown to be an extensive and productive source of water supply in the area. The water supply potential appears to be more than adequate to meet the needs of the area in the forseeable future.[12]

Because of the high degree of permeability of the aquifer in most of the area, it has been largely flushed of saline water. The confining beds above and below the aquifer provide good protection from vertical encroachment of saline water. Rainfall on the mainland is the source of recharge where the confining bed above the aquifer is absent, thin, or relatively permeable. The data indicate the major center or recharge is on the west side of Croatan Sound where the confining bed possibly terminates, and where the permeability and transmissivity of the aquifer are highest. From the recharge area the water moves beneath the sounds toward Roanoke Island and the beaches.

The test data from a well at Kill Devil Hills show that water-supplies to supplement or replace the existing supplies can probably be developed from the principal aquifer in the beach area between Kill Devel Hills and Nags Head. The data show the water in the aquifer to have a chloride content of about 140 ppm, indicating that water of fairly good quality may be available. Water from the test well was somewhat high in organic color; however, this is probably a local condition, as no significant color was noted for the water at any other test sites. The data indicate that water supplies with a chloride content less than 250 ppm can probably be developed on Bodie Island.[12]


Geology & Groundwater on Bodie Is.
JOCKEYS RIDGE
Atlantic Ocean
U.S. 158
Roanoke Sound
msl
60'
sand and shells
Unconfined Aquifer
clay and interbedded clay and sand
Aquitard
155'
Top of Yorktown Formation
40'
clay
Principal Aquifer
40'
Aquitard
95'
Lower Aquifer
interbedded clay and fine sands
Aquitard

SURFACE WATER

The surface water features in this area are the tidal waters of Roanoke Sound, which forms the western boundary of the site, the Atlantic Ocean, which is close enough to have a definite salt spray effect on the front line vegetation, and the numerous freshwater ponds which have a significant effect on the water supply.[8]

Roanoke Sound is the body of water between Bodie Island and Roanoke Island. It spans the distance between Colington Island and the Oregon Inlet, and is classified "SA", meaning that it is suitable for fishing, propogation of wildlife, bathing and recreation, and shell fishing for marketing. The Atlantic Ocean, forming the eastern boundary of Bodie Island, is classified "SB", denoting suitability for all uses except shell fishing close to the shore.[13]

The freshwater lakes occur in the Nags Head Woods area and are reflections of the high water table present on the Outer Banks. They exist in the depressions between the north-south oriented old dune systems, and are believed to be the product of wind-scooped depressions in this ancient dune section. The lakes have large storage capacities. The volume of the largest lake was measured at a time when the lake surface was at 9.4 feet above mean sea level and the average maximum depth of the lake was 15 feet. At that time, the lake contained approximately 90,000,000 gallons of water and its surface covered approximately 35 acres. The other unnamed fresh water lakes in this area are smaller, but their aggregate water volume would be sizeable. The lakes are apparently recharged by rainfall and by inflow from the upper aquifer.

A chemical analysis of the largest lake indicates that the lake water is considerably lower in total dissolved solids, particularly iron, than water from the upper aquifer.[8] This reservoir provides approximately 1.3 million gallons per day of water, and is classified "A-II," which is intended for use as a water supply.[13]

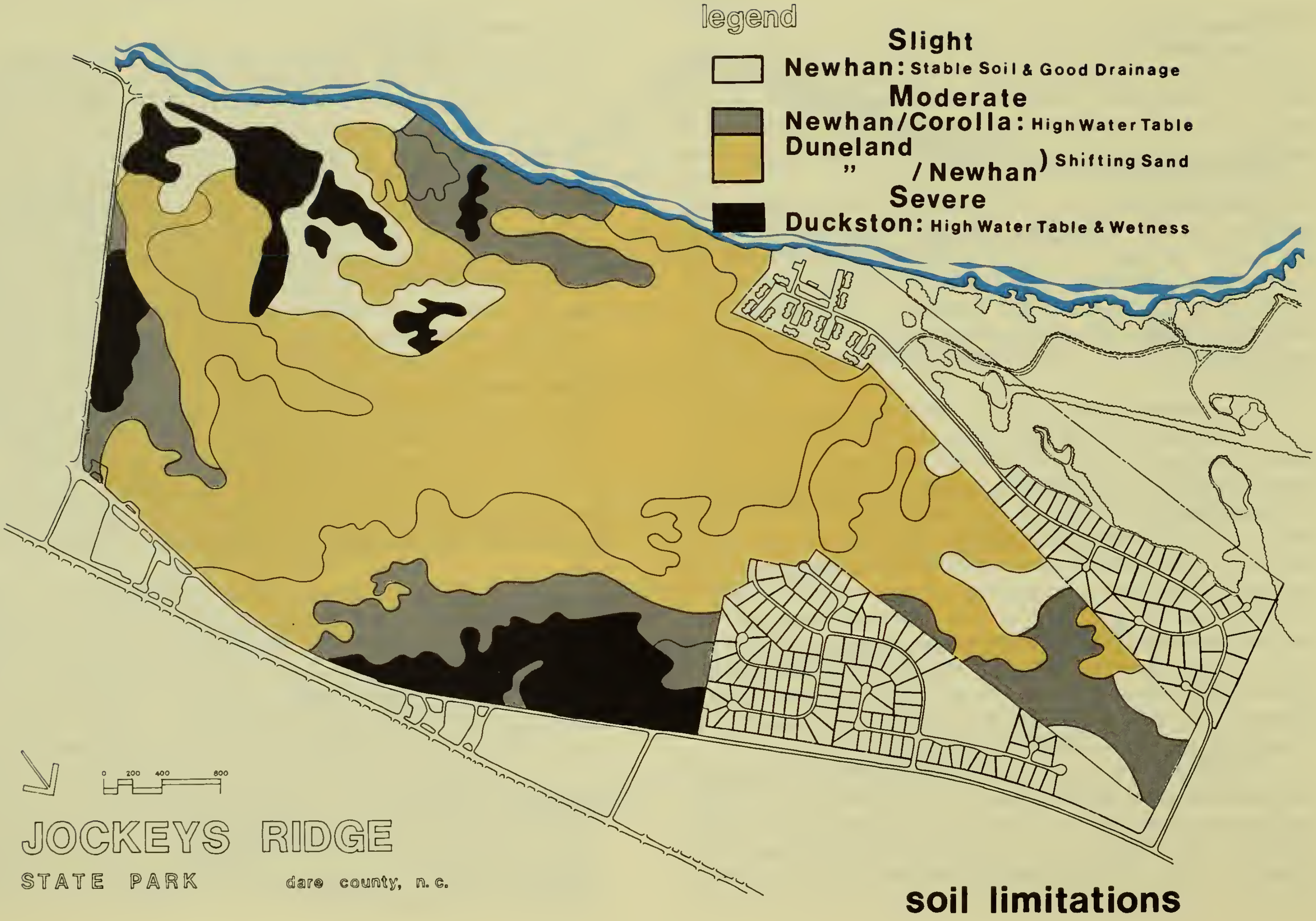
SOILS AND VEGETATION

There are seven different soil classifications present in the immediate vicinity of Jockey's Ridge: four distinct soil units and three soil complexes composed of varying amounts of the four soil units. The soils are all sandy in nature, and the limitations imposed by the soils are related both to the permeability of the sands and to the amount of stabilizing vegetation present.

The only soil type identified as having good potential for development is the Newhan fine sand classification. These are deep, well-drained and excessively drained soils, having slopes ranging between two and thirty percent. The permanent water table or seasonal high water table is well below 36 inches and is generally greater than six feet. These soils have more than 40 percent of the surface vegetated, and are considered to be fairly well stabilized. Vegetation consists primarily of sea oats, beach grass, smooth chord grass, and bayberry on areas close to the beach. Further from the beach smooth chordgrass, waxmyrtle, live oak and other less salt tolerant species occur.

Included with the Newhan soils of the mapping units may be area of 2½ acres or smaller of Corolla and Duckston soils. Also, small areas with less than 40 percent surface vegetation may occur.

The Corolla sand soils are moderately well and somewhat poorly drained sands. The permanent water table or seasonal high water table ranges from 18 to 30 inches below the surface. Corolla soils are generally well stabilized with smooth chordgrass, bayberry, and waxmyrtle near the beach. Less salt tolerant species such as live oak, pine, and black cherry are found further from the effects of salt spray. Some areas may exhibit the wetness which is characteristic of the series but lack vegetation because of the rapidly shifting sands or because of previous overwash effects. Corolla soils have fair to poor potential for development. The limiting factor is wetness, with considerable potential for septic system malfunction and/or contamination of ground water.


legend
Slight
Newhan: Stable Soil & Good Drainage
Moderate
Newhan/Corolla: High Water Table
Duneland
" / Newhan) Shifting Sand
Severe
Duckston: High Water Table & Wetness
0 200 400 800
JOCKEYS RIDGE
STATE PARK
dare county, n. c.
soil limitations

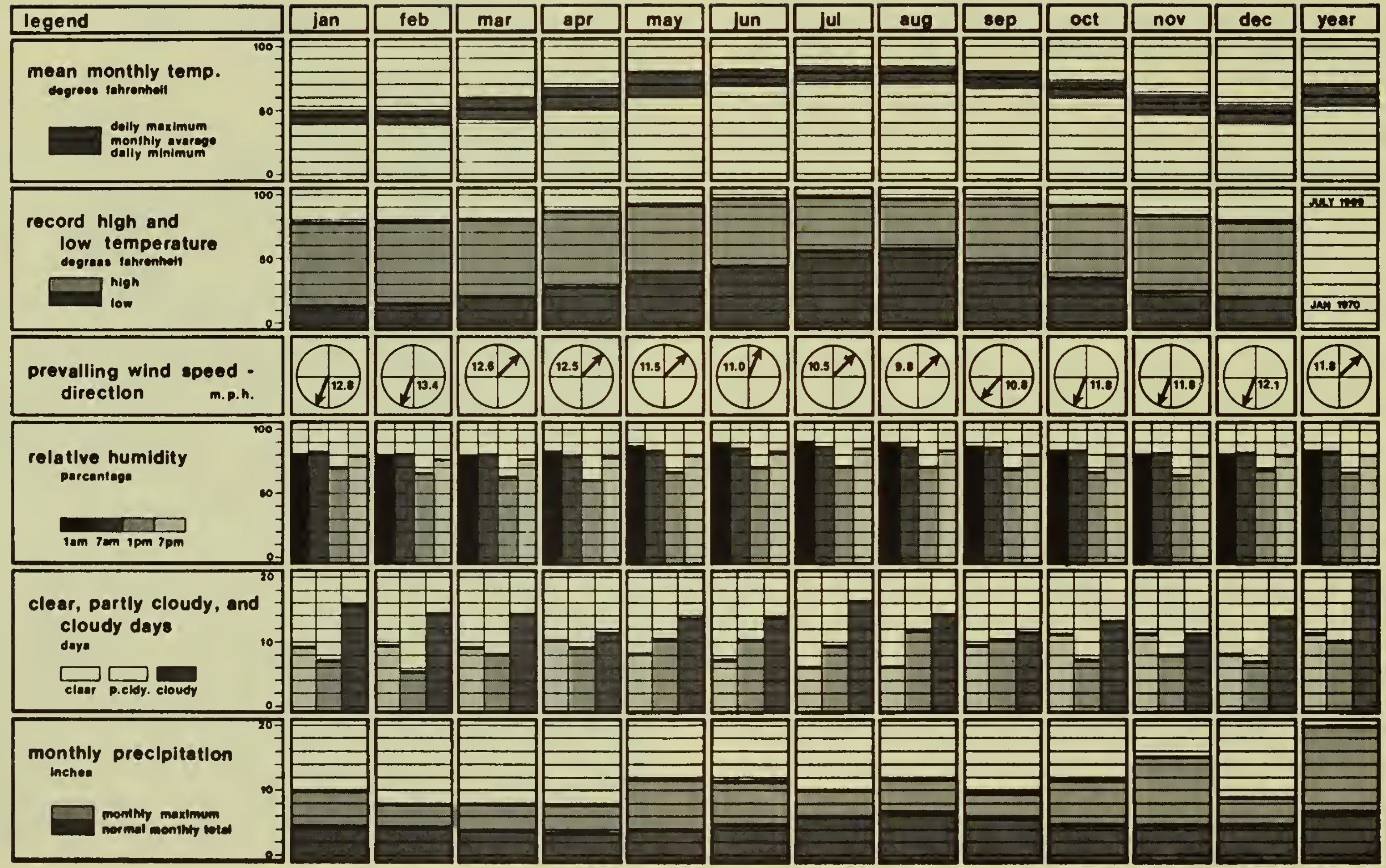
The next soil unit, the Duckston sands, are the poorly drained sands. The permanent water table or seasonal high water table is at the surface or within 18 inches of the surface throughout most of the year. Duckston soils are generally well stabilized with dense stands of smooth chordgrass, bayberry, and waxmyrtle on areas close to the beach. Further away from the beach and the effects of salt spray species such as black willow, maple and greenbrier occur. Like the Corolla soils, some areas of Duckston may lack vegetation because of the effects of rapidly shifting sands or overwash effects. Duckston soils have poor to very poor potential for development. The limiting factor is wetness, with a high potential for septic system malfunction and/or contamination of ground water.

The last individual soil unit is named Duneland, which is very descriptive. It consists of the deep, excessively drained areas of shifting sands. Less than 15 percent of the surface is vegetated, and then only with typical dune grasses. Small areas of Corolla, Duckston and Newhan soils can also be found within the limits of this soil unit.

The Newhan-Corolla complex is a major soil combination in the Jockey's Ridge vicinity. This complex consists of approximately 50 percent Newhan soils and 35 percent Corolla soils on slopes less than 30 percent. Both of these soils within this mapping unit have the characteristics and interpretations as given for the individual units above. Small areas of Duckston soils may also be included in this mapping unit, as well as small areas which have less than 40 percent surface vegetation.

The Corolla-Duckston complex is the next combination of soils to be examined here. It consists of approximately 55 percent Corolla soils and 40 percent Duckston soils. The soils within this mapping unit have the same characteristics and interpretations as the individual units. However, Corolla soils are generally somewhat poorly drained in this mapping unit. Smaller areas of Newhan soils may also be included with this mapping unit.

The third soil complex present at Jockey's Ridge is the Duneland-Newhan complex, having slopes between two and thirty percent. Newhan soils have more than 40 percent of the surface vegetated. Duneland is defined as areas of well drained, sparsely vegetated and rapidly shifting sands for purposes of this survey. Duneland mapping units have less than 15 percent vegetative cover. Therefore, the major consideration of soils in this mapping unit is the lack of stabilized vegetation. There is a high potential of shifting sands which can result in the undermining or covering up of roads and structures.[24]


legend
jan
feb
mar
apr
may
jun
jul
aug
sep
oct
nov
dec
year
mean monthly temp.
degrees fahrenheit
daily maximum
monthly average
daily minimum
100
50
0
record high and low temperature
degrees fahrenheit
high
low
100
50
0
JULY
JAN 1970
prevailing wind speed - direction
m.p.h.
12.8
13.4
12.6
12.5
11.5
11.0
10.5
9.8
10.8
11.8
11.8
12.1
11.8
relative humidity
percentage
1am 7am 1pm 7pm
100
50
0
clear, partly cloudy, and cloudy days
days
clear p.cldy. cloudy
20
10
0
monthly precipitation
inches
monthly maximum
normal monthly total
20
10
0

CLIMATE

Cape Hatteras with its maritime climate is cooler in the summer and warmer in winter than the mainland. Ninety degree temperatures are rare, the summer temperatures normally are in the mid-80's and the yearly average temperature is 61.7°F. The average date for the first occurrence of temperatures as low as 32 degrees Fahrenheit is December 5th. The average date of latest occurrence is February 25th.

The average rainfall at Cape Hatteras is greater than for other North Carolina coastal stations, due to heavy and prolonged rains associated with offshore storms. Rainfall is rather evenly distributed throughout the year reaching a maximum of about 6 inches per month in July, August, and September. Normal yearly precipitation totals about 55 inches on the average. Snowfall is rare and is usually light in amount, melting as it falls.

The prevailing winds at Nags Head are southwesterly, but examination of the wind records shows that the winds are approximately balanced. The six months between March and August show southwesterly winds, while the remaining six months, September through February, have northeasterly winds of about the same magnitude.

The Gulf Stream passes offshore at a distance of 20 to 50 miles from Cape Hatteras. In winter the southernmost penetration of the Labrador Current is near the Cape, making the waters off Cape Hatteras the favorite breeding ground for storms. These storms usually move north before reaching full maturity, venting their fury on the North Atlantic Coast, while only mildly affecting the Hatteras area.

Tropical storms moving up the Atlantic Coast occasionally pass within a few miles of Cape Hatteras. These storms produce heavy rain, strong winds, and tides over the island. The vegetation of the area shows the effect of these winds. Wrecked ships on the beach attest to the fury of wind and wave; however, there is no record of any death or serious injury caused by a hurricane to anyone on the island.[25]

DEVELOPMENT LIMITATIONS

The major limitations on development at Jockey's Ridge are imposed by a combination of natural factors, most notably the susceptibility of the entire Outer Banks to flooding, the constantly shifting sands, and the high water table under most of the land.

As discussed earlier, the Outer Banks are extremely low in elevation, and the possibility of overwash is always present. The Banks have a history of storm-caused overwash opening up new inlets, closing old ones, and flooding low-lying areas. As it so happens, the land around Jockey's Ridge is very low, a large portion of it being under 10 feet above mean sea level. On the land owned by the State, the only lands above the 10 foot contour are the immediate foothills or slopes of the major dune system.

These lower slopes of the major dune system are considered undesirable for development, due mainly to the constantly shifting nature of the sand. As the winds change direction from one time of the year to another, the size, shape and spread of the Ridge change and expand. Any development will have to recognize the historic variations of the dune, and allow the sand to move around unimpeded while placing any permanent facilities in positions that will not be endangered by that movement.

The soils impose perhaps the strictest limitations on facility location at Jockeys Ridge because of the shifting sands and associated high water table. Even though the Newhan and Duneland soils are well-drained, the Corolla, Duckston, and Corolla-Duckston soils are rated as possessing severe limitations on development. These are the soils that are very wet in nature, having depths to water table ranging from the surface to only 30 inches. Besides being undesirable for foundations, a high potential for contamination of ground water exists due to possible septic system malfunction in these soils. Therefore, these soils should be avoided when siting any proposed facilities.

MASTER PLAN

ACQUISITION AND DEVELOPMENT

Protection of Jockey's Ridge from further development and providing safe public access for park visitors are the primary responsibilities of the Division of Parks and Recreation. In order to protect the Ridge, the remaining portion of the main dune must be acquired. Approximately 150 acres of the original 420-acre proposal have yet to be purchased, and should be considered the minimum additional acreage needed to protect the present boundaries of the Ridge.

The Ridge will be left in its present state, a free-moving sand dune. No attempts will be made to influence the movement of the dune or to stabilize different areas. The movement of the Ridge has generally been towards the southwest, and should continue; however, the rate of movement is still unknown. Aerial photographs taken in 1949, 1957, and 1974 have shown that parts of the Ridge have been moving in a northwesterly direction, thus slowing the rate of southwesterly movement.

To protect the visual quality of the Ridge, the miniature golf course and the hamburger stand at the corner of the U.S. 158 Bypass and the "Old Soundside Road" should be purchased and removed. In addition, the Division will request from Virginia Electric Power Co. (Vepco) that the power lines behind the Ridge be placed underground.

The homes along "Old Soundside Road" will not be purchased as long as they remain in residential use. If the land use or zoning classification changes from the existing SPD-20 to a commercial or industrial zone, the property should be purchased. Otherwise, the residential use is compatible with the adjacent park.

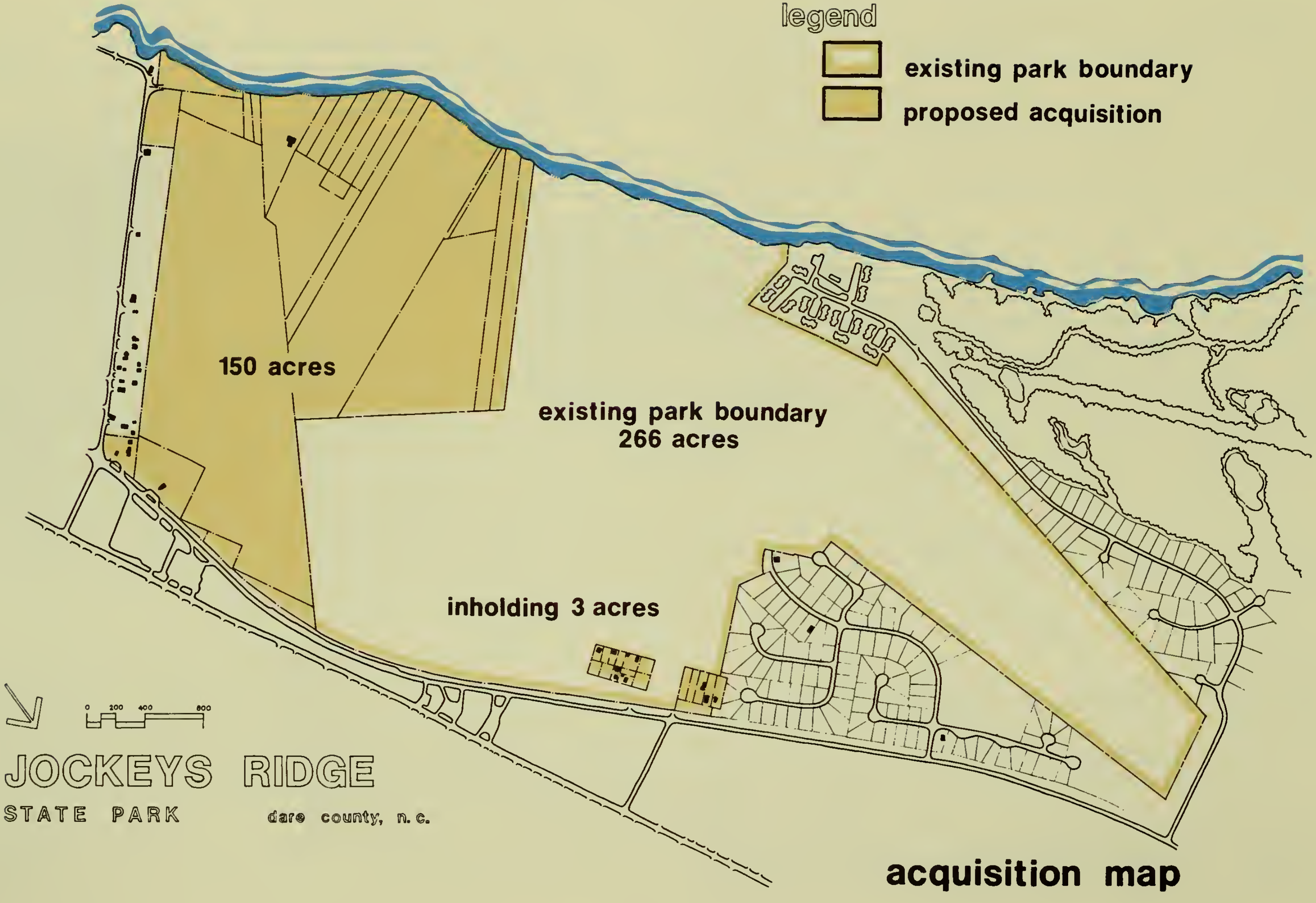
The inholdings south of the Old Vista Harbour Road are also included in the acquisition proposal. Two one-acre parcels have been subdivided into twelve pieces, and six one-story wooden frame residences are located on the property. Only one of the dwellings is in year-round use, and the other 5 are summer cottages. None of the homes are suitable for park use.

In order to provide a buffer from the neighboring North Ridge Estates Subdivision, the one-acre tract north of the Vista Harbour Road should be purchased. This tract is subdivided into 5 lots with two permanent homes and one mobile trailer.

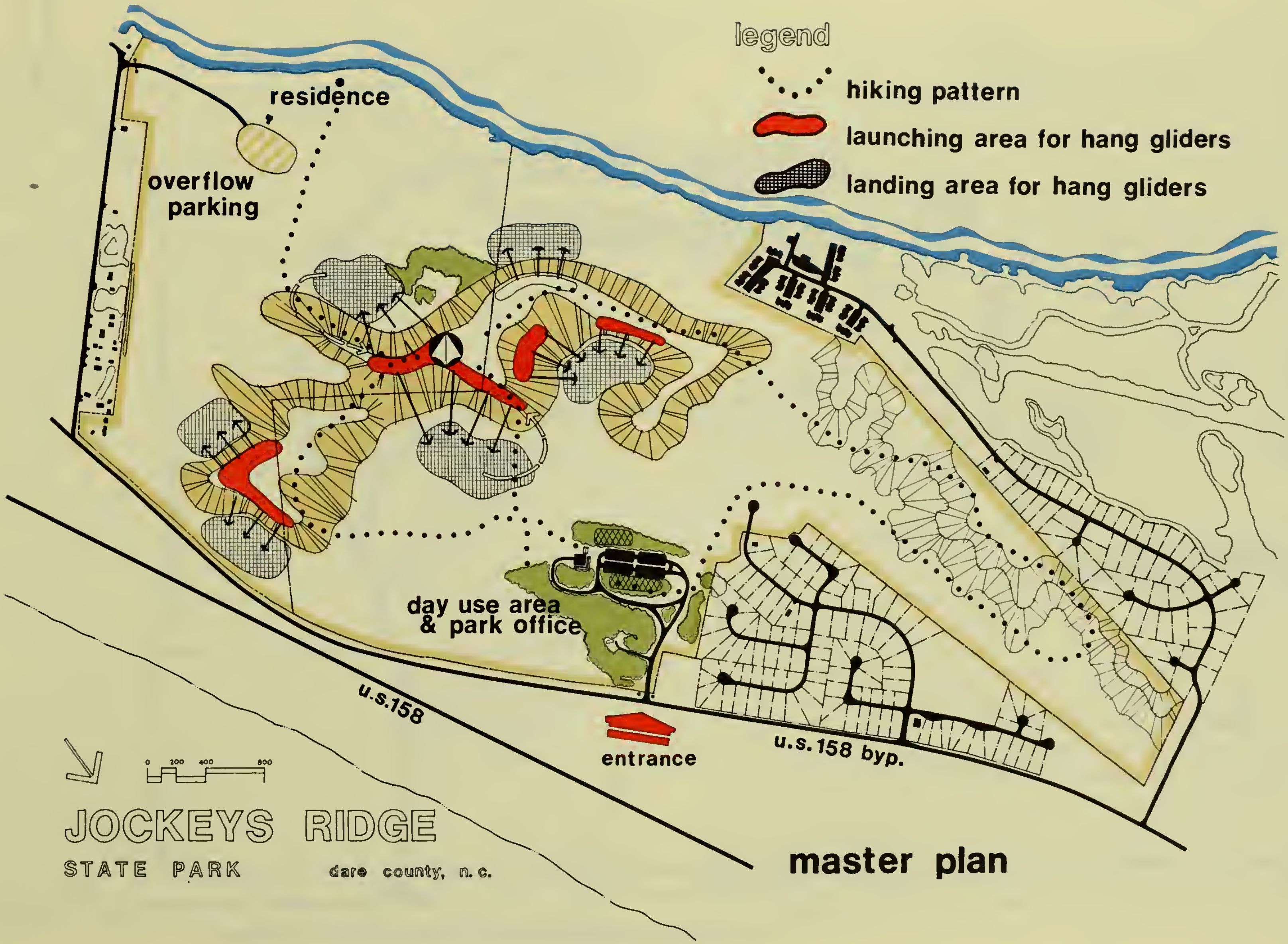
Public access for vehicular and bicycle traffic on the U.S. 158 Bypass will be provided at the Old Vista Harbour entrance. This will be the main park entrance and all park facilities will be located here. The shrub thicket immediately northeast of the main ridge will be the location for the parking lot and park office/maintenance area. The Old Vista Harbour Subdivision road will be retained to the parking area, but will be closed for traffic beyond this point. The road surface is presently in poor condition and will require either resurfacing or paving.

The intersection at the park entrance will also require modification if a continuous traffic flow on the bypass is to be maintained. Presently, the U.S. 158 Bypass is a two lane highway with a speed limit of 55 mph, and a seasonal limit of 45 mph. If a turning lane for northbound traffic is not added, traffic will be periodically stopped. In addition, an entrance lane for southbound traffic and a reduction of the seasonal speed limit to 35 mph is recommended. Eventually the bypass will be widened to 4 lanes; however, this project has not been included in the North Carolina Division of Highway's seven year capital improvements program.

If the parking area and entrance were developed this year, Jockey's Ridge State Park could expect from 300,000 to 400,000 visitors. During the 3 summer months of June, July and August, over half of the park visitors will be received, approximately 200,000. Visitation records kept by the National Park Service for the National Seashore, indicate that visitation of Wright Brother's Memorial has increased on the average 10 to 15 percent yearly since 1970. If this annual increase is used to project future use, the park will receive approximately 500,000 visitors by the year 1981.

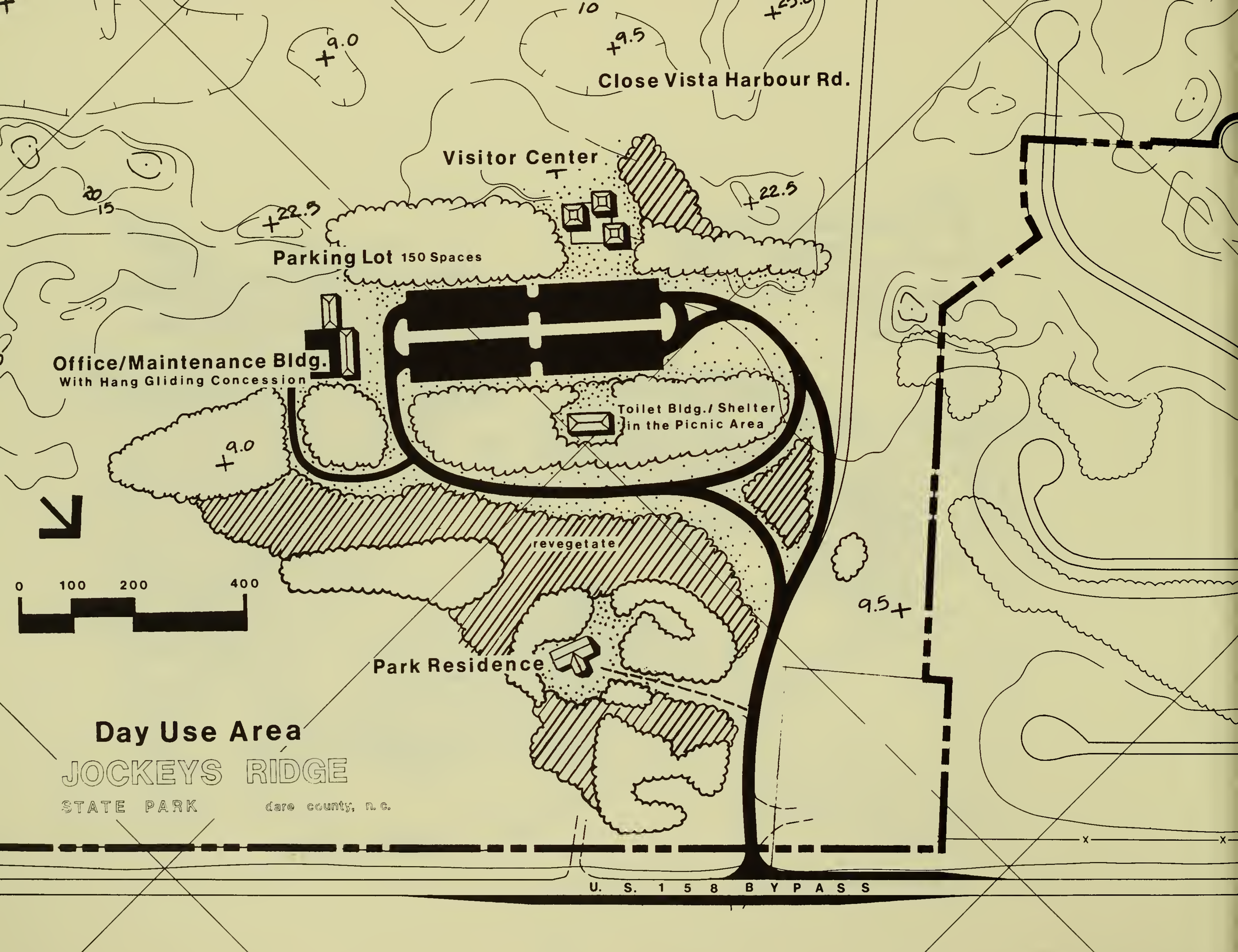


acquisition map


legend
hiking pattern
launching area for hang gliders
landing area for hang gliders
residence
overflow parking
day use area & park office
u.s.158
entrance
u.s.158 byp.
0 200 400 800

JOCKEYS RIDGE
STATE PARK
dare county, n.c.

master plan


10
9.0
9.5
Close Vista Harbour Rd.
Visitor Center
22.5
20
15
22.5
Parking Lot 150 Spaces
Office/Maintenance Bldg.
With Hang Gliding Concession
Toilet Bldg./Shelter
in the Picnic Area
9.0
revegetate
0
100
200
400
9.5
Park Residence
Day Use Area
JOCKEYS RIDGE
STATE PARK
dare county, n. c.
U. S. 158 BYPASS

Hiking to the summit of Jockey's Ridge has always been the favorite recreational activity, and will probably remain so. Children and adults enjoy climbing and playing on this huge pile of sand. Once at the peak, the surrounding panorama is very scenic and effectively illustrates the fragile nature of the Outer Banks.

Visitors require approximately one hour to hike to the summit of the Ridge, view the area, and return to the roadside parking lot. The intense summer heat and blowing sand usually deter visitors from staying longer. For these reasons, a high-turnover day use program is being planned for the park.

Using the projected visitation figures, the park can expect approximately 750 vehicles per day or 2600 visitors during an average day in the summer. For a short term recreational area such as Jockey's Ridge approximately 8 turnovers per day can be expected. Initially, 100 parking spaces will be required, and by 1981, 50 more spaces will be needed. At that time, the projected growth rate of 10 percent should be evaluated.

A bike rack will be provided in the parking area to accommodate cyclists. Dare County in conjunction with the National Park Service has plans for an extensive bike route system that would include Jockey's Ridge. The park will be a major destination point along the route.

The park office and maintenance area will be combined in one building for convenience, and shall be located immediately south of the parking lot. This office will be the main visitor and administrative center for all park affairs. Use permits, public information and other public requests will be handled through this office. Approximately 750 square feet of space will be required for office, storage, and sanitary facilities.

Storage space for park supplies, equipment, and vehicles along with a workshop for minor machinery repair and park construction will be provided in the building. An additional 1000 square feet of space will be needed for these maintenance functions.

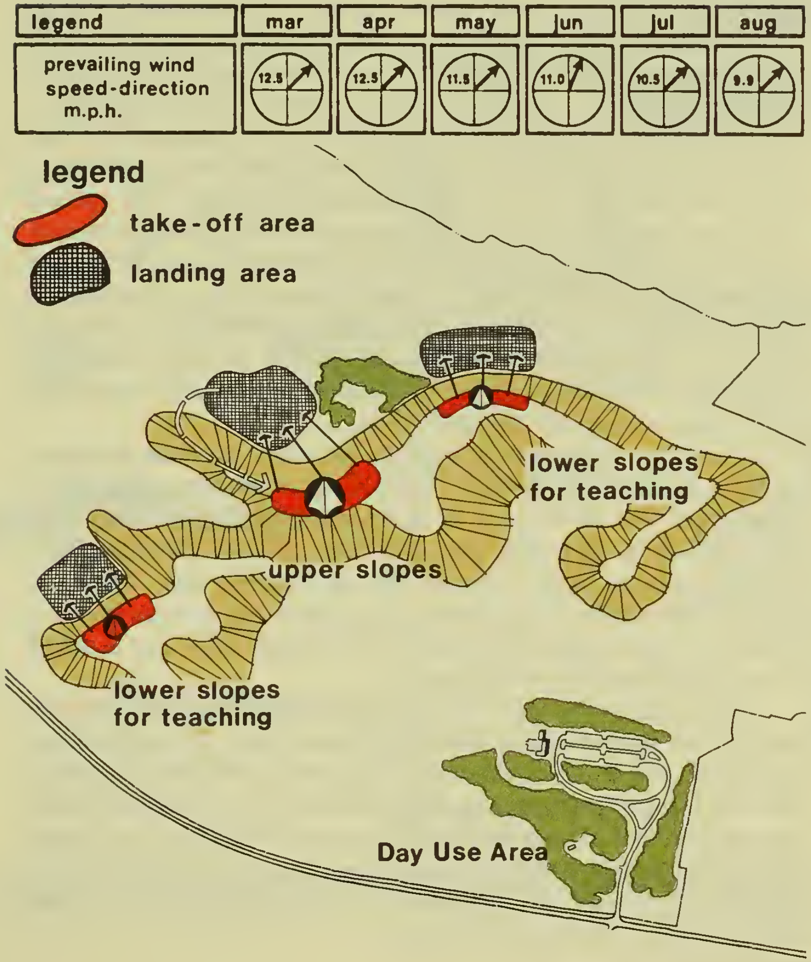
The park office/maintenance area and parking lot are located in an area that has been stabilized by a shrub ticket. The elevation above sea level is 9 to 10 feet, which is just above the 100 year flood level. Of course, the site is susceptible to inundation during a severe tropical storm, as is the remainder of Bodie Island. According to the Department of Housing and Urban Development, this is an area of moderate flood hazard for a coastal community.

The nature of shifting sand prevents construction of traditional trails in the park. For this reason, the Ridge will be in visual contact with the park office and parking lot. The visitors will be allowed to choose their route to the Ridge and to hike to any part of park property. Public information, and park rules and regulations will be available at the office and on free-standing interpretive exhibits. The unique character and significance, the physical and cultural history, and movement of the Ridge will all be described and illustrated within these free standing, all-weather exhibit cases.

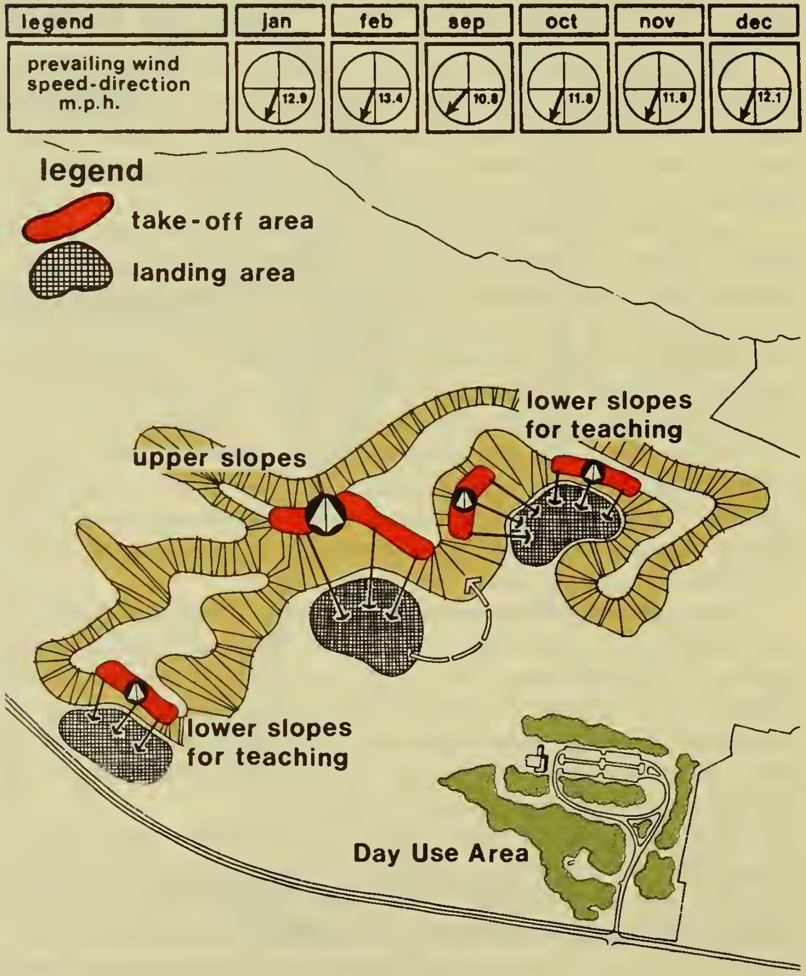
To satisfy the need for public sanitary facilities for park visitors, a combination toilet building and shelter is proposed adjacent to the parking lot. A facility with 4 water closets and 4 lavoratories for females, and 2 urinals, 3 water closets and 4 lavoratories for men should be considered the optimum design. The shelter should include sufficient space for four 6' x 8' picnic tables, (approximately 600 square feet) and a small area for self-service machines.

Because of the high projected turnover rate, only 20 percent of the park visitors will be provided with picnic facilities. Additional tables will be located adjacent to the toilet building, and will have a protective wooden shelter. Each shelter will accommodate two tables and will be oriented to protect the visitor from the sun and blowing sand. Altogether, 20 tables are proposed, and if visitation increases as expected, 10 more tables will be needed within five years.

hang gliding slopes for southwesterly winds



hang gliding slopes for easterly and northeasterly winds



Hang Gliding: Two additional recreational activities, hang gliding and model plane soaring, are being proposed on a conditional status. The Ridge is an ideal land form for hang gliding and model soaring, and is not harmed in any way by the pedestrian traffic generated by pilots or spectators. The principle conflict occurs between landing hang gliders and hikers. For this reason, hang gliders will be restricted to specific slopes on the Ridge, and each pilot will have to substantiate his flying ability to the satisfaction of the park superintendent. Supervision of all hang gliding activities shall be the direct responsibility of the park superintendent, and he shall have the discretionary power to interpret State Park rules and regulations. On a yearly basis, an evaluation of park practices shall be done in order to modify the recreation program or park regulation.

A hang gliding service for glider rentals and flying lessons is incorporated in the recreation program. The Ridge offers an excellent opportunity for beginning hang glider pilots to attain flight experience without fear of serious injury. The service will be under the direct supervision of the North Carolina Division of Parks and Recreation, and the Park Superintendent shall be the Division's official representative at the Park. Management of the service can be accomplished by either private concessionaire or by State Parks. In either case, the administrative and management facility for the service will be located adjacent to the park office, and additional parking spaces are included in the previous parking proposal.

Hang gliding is a popular sport, and special events such as the National Tactile Flight Championships sponsored by the Outer Banks Chamber of Commerce should be included in the park recreational program. This event occurs yearly and attracts the best hang glider pilots on the eastern coast of the United States.Temporary overflow parking for 200-300 vehicles can easily be provided in the depression on the south side of the Ridge. The high water table prevents this site from being a permanent location for a parking lot; however, the area is suitable for limited use once or twice a year.

Model plane soaring poses no real threat to other park activities. All planes are launched from the peak of the Ridge, and attain a minimum altitude of 50 feet. The radio controlled planes can be landed anywhere the pilot wishes, so the risk of injury from a model plane is remote. At Jockey's Ridge model pilots usually 'fly' individually or with a small group of 3 to 4 people. They do not attract large numbers of spectators, and since only two clubs are within 300 miles of the site, the demand placed on the Ridge from model soaring pilots is minimal. The variable nature of the winds also prevents enthusiasts from traveling long distance to 'fly' here, and therefore it is not a popular site for model soaring contests.

A Visitor Center designed to accommodate the heavy seasonal visitation experienced on the Outer Banks is being proposed for Jockey's Ridge. A facility of this type could be used to expand the nature interpretation program of the Ridge, and to advertise other State Parks in the system. The interpretive program would focus on the unique character and moving nature of Jockey's Ridge. A system using wind monitoring devices and aerial photography can be devised to map the Ridge's movement, and the information could then be exhibited in the center. Wind monitoring stations can be placed at strategic sites around the Ridge to acquire accurate wind speed and directional data.

The visitor center shall orient and provide public information for the park visitor. Space shall be allocated for the naturalist's office and laboratory, exhibits (1000 square feet), auditorium storage, and restrooms. The exhibit hall will consist of exhibits, electronic equipment, and interior structures for the exhibits. The displays shall address geological history, cultural history, dune floristics, and dune movement patterns. The auditorium shall seat a maximum of 75 visitors, and provide an audio-visual system for orientation programs. Furnishings shall include folding chairs, a rear projection screen, slide projectors, and sound equipment. The space can also serve as a local meeting and seminar facility for the community.

The visitor center will be located in the same area as the park office/maintenance complex, and all visitors will use the proposed parking lot previously described. Fifty additional parking spaces should be provided along with the visitor center's construction.

Two park residences will eventually be developed on park property. The first residence shall be located east of the maintenance area and shall be the permanent year-round home for the park superintendent. The other residence will be located on the back side of the Ridge. The superintendent's chief assistant, a Ranger II, shall occupy this residence, and he shall be responsible for monitoring illegal access from the Old Soundside Road to the temporary overflow parking area. Presently, the Midgett house is in the general location that would be ideal for a residence, however, it will not be developed until an equitable agreement has been reached with the family.

Services to Park Users: Jockey's Ridge State Park is unlike most of the other State Parks for a variety of reasons. It is an entirely unique feature, a living dune system, existing on a very compact piece of land; it is open in character, being wind swept and moved at the whim of the winds. It is imperative that the services to be provided for protection of both the park users and the resource itself be responsive to the situation and circumstances existing there. As at other parks, the legal authority vested in park personnel is an effective means of controlling activites and preventing misuse of the park.

The park personnel should systematically control the land owned by the State in order to educate the public to park philosophy and regulations. This program should be closely coordinated with the local law enforcement agencies, and the help of these agencies should be actively pursued. This help will definitely be needed during the time that only interim facilities are provided at the site, but will also be desirable after development of the recreation facilities.

In addition to direct contact by park personnel, an information program should be designed to help orient and educate the park users. A series of booklets or pamphlets explaining the origin of the Outer Banks, the development of Jockey's Ridge, and the natural forces at work on the dune system could be used to instill in the park visitor an awareness of the fragile yet yielding nature of the Ridge and its supporting dune system. If the public understands the reasons that Jockey's Ridge exists, and can see the way that man fits into the overall scheme of things, that understanding will go a long way toward helping protect the natural feature.

Visitors should also be well-oriented to the location of park facilities and to the routes of access to the top of the Ridge that do not interfere with other users of the park. An access system will be established so that as little conflict as possible between hikers and other users, such as hang gliders, will occur. Ability to wander over the dune will not be hindered, but it must be understood that all of the various users of the dune must not hinder each other's rights to use the feature. The access system will be based, more or less, on common sense and courtesy, and all park visitors will be expected to abide by these rules.

PARK MANAGEMENT

In order to protect the park and manage the recreational activities, only one full-time park entrance will be provided. Other entrances will remain closed to the public except when special activities are planned, or when demand for parking spaces exceeds those available. The parking along the U.S. 158 Bypass will be removed, and a 24-hour parking lot will be provided on the park property. Arrangements will be made with the Town of Nags Head Police Department to allow them to patrol this parking area as part of their regular patrolling duties, and they will retain authority to issue citations to anyone parking illegally either in the parking area or along the U.S. 158 Bypass. This cooperation between the State and the Town of Nags Head is essential to protect all owner's property rights and continue freedom of access at all times to Jockey's Ridge. Climbing the dune at all times would be allowed as long as no problems arise; but, for example, if surrounding property owners sustain damages, the policy would need to be revaluated.

Maintenance of the Park is essential for upkeep of the facilities and ensuring that trash and litter do not spoil the scenery around the dune for park visitors. The physical appearance and condition of the park can greatly influence the park visitor's attitude while he is in the Park. Therefore, the maintenance area will be in close proximity to the major use areas in the Park. Storage space for park supplies, equipment, and vehicles, along with a workshop for minor machinery repair and park construction will be provided in the maintenance building, which will either be a part of, or will be very close to the park office.

During the time that interim facilities are provided at the Park, the staff will be limited to a seasonal Ranger II, 2 seasonal Park Attendants, a part-time secretary, and whatever labor support is needed. When the Park office and maintenance areas are built, the existing park staff will expand to include a Superintendent and seasonal Park Naturalist in addition to the staff already present, which will be made permanent full-time. In the event that facilities are expanded to include a visitor center and museum, at least one additional Ranger position will be needed to handle increased work loads.

In addition to the normal park duties, the staff will be responsible for management and control of two activities which have not been normally associated with State Parks until this time. These activities are hang gliding and model airplane soaring, both of which have become popular at Jockey's Ridge. In order to ensure that users of the Park do not interfere with other visitors, a program allowing certain control of all activities will be implemented.

INTERIM FACILITIES

During the time that preceeds construction of permanent facilities, the ability to control the site and provide maintenance services will be necessary. The interim facilities will be located in the same area that will be used for the permanent park office and other related services; the shrub thicket northeast of the main dune will be the site used for this purpose.

One of the first actions to be accomplished in the interim phase will be the removal of the linear parking lane across the western side of the U.S. 158 Bypass and construction of a parking lot on State-owned land inside the Park boundary. This parking lot will provide space for 50 cars, and will be the first of four similar size parking bays to be ultimately provided. Access to this parking lot will be by the Vista Harbour Road. This road will be resurfaced as needed to handle the increased traffic load, as will the parking area it serves.

A temporary park office will be located close to this parking area. This office will more than likely be a mobile trailer, which will remain on-site until a permanent park office is built. In addition, a vehicle shelter and a 150 square-foot storage building will be closeby.

During the interim period, a total of approximately 2000 people per day should visit the Park during the summer months. In order to adequately serve this many people, the toilet building and shelter will be constructed in the same general area as the park office and parking lot. Four water closets and four lavoratories for females, and two urinals, three water closets, and four lavoratories for males and 600 square feet of covered shelter will be provided in the building. It will be sited to take advantage of the views of the Ridge, and a vegetation buffer will be used to screen the area from the Bypass and North Ridge Estates.

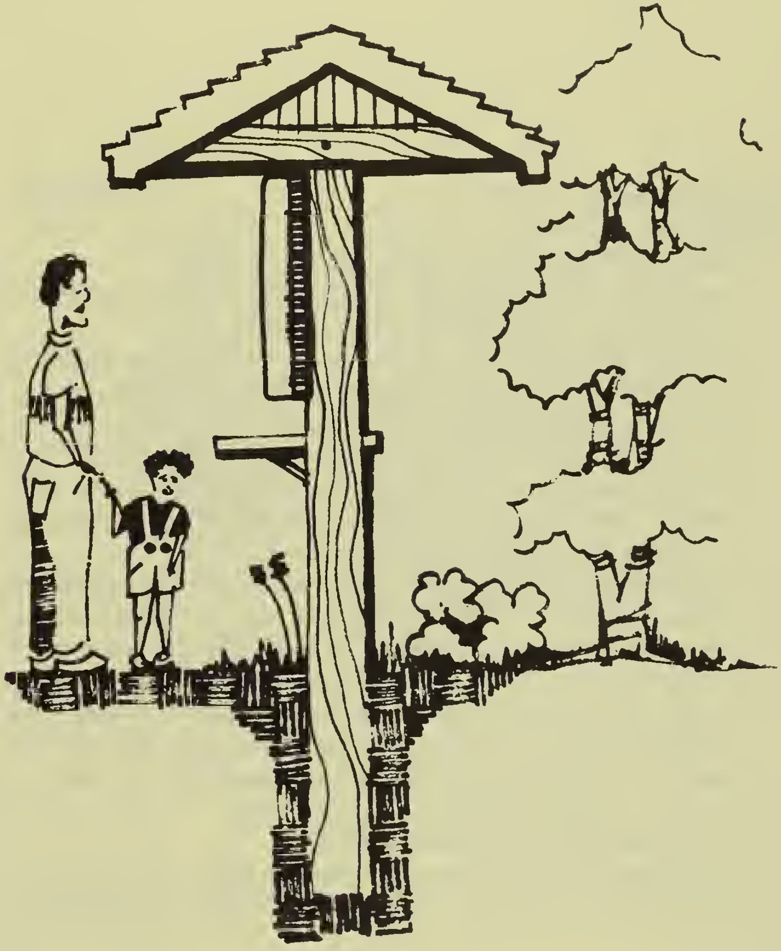
Only two park gates will be needed to control the area. The first gate will close that section of the Vista Harbour Road that runs behind the Ridge. The parking lot will be left open 24 hrs. a day, and surveillance during the late evening and early morning hours will be provided by the Police Department of Nags Head. The other gate will stop illegal entry from the Soundside Road behind the Ridge.

One park entrance sign will be needed at the intersection with U.S. 158 Bypass. In addition, State Highway signs identifying the park should be placed at 1, 5, and 10-mile increments from the Park along all major highways, U.S. 158, U.S. 158 Bypass, and U.S. 64/264. A seasonal speed limit of 35 mph should be designated along the length of the Park during the summer months of June, July, and August. The remainder of the year, the limit should be 45 mph.

The interpretive program will consist of 3 free-standing, exhibit cases that will be placed at convenient locations in the park. Park rules and regulations, maps, and natural and cultural information will be exhibited.

Virginia Electric and Power Company will be requested to place their transmission lines underground. The overhead power line runs the length of the park, and its removal from sight would make a substantial improvement to the scenic quality of the Park.

Outdoor Exhibit Case



DEVELOPMENT PHASING

INTERIM FACILITIES

1. Resurface 1000 linear feet of entrance road.
2. Parking lot for 50 vehicles, 15,000 square feet of asphaltic concrete; and one rack for 10 bicycles.
3. Mobile park office, vehicle shelter, and storage building (150 square feet). A water meter and 200 feet of water line will be needed to connect to the city water supply. The office will require approximately 200 gal/day. Septic tank and tile drain field will be needed for the sewerage system. 1200 feet of underground telephone and electrical line will be needed to supply service to the area.
4. Combination toilet building/rest shelter. Summer visitation should average 2000 to 2400 people per day; toilet building will need a supply of approximately 15,000 gal./day and a facility with 4 water closets, 4 lavoratories for females, and 3 water closets, 2 urinals, and 4 lavoratories for males. One drinking fountain will be needed along with 200 feet of water line. 200 feet of underground electrical line will be needed to supply power to the building.
5. 3 free-standing interpretive exhibits.
6. One State Park entrance sign and two gates — one for the Vista Harbor Road and one for the Old Soundside Road.

PHASE I

1. Add 50 parking spaces to the existing lot.
2. Repave park entrance road, 1500 linear feet of asphaltic concrete.
3. Permanent park office/maintenance building — 1000 square feet for maintenance and 750 square feet for administrative space. Water supply of 200 gal./day will be needed along with additional water line and other accessories. Septic tank and tile field will be used to dispose of sewage. Existing underground electrical and telephone lines will be used to supply power.
4. Building for Hang Gliding Concession, size to be determined later. All utilities lines, electrical and telephone, will be underground and the building will need new water line and accessories, and septic tank and tile field. Sewerage can be combined with office/maintenance area building.
5. Permanent Park Residence in the Day Use Area. 1500 square-foot residence with 100 feet of gravel driveway. A 200 gal./day water supply will be required along with 100 feet of water line and other accessories. New underground telephone and electrical lines will also be provided to the residence.
6. 8 wooden picnic shelters (285 square feet) and 16 picnic tables, and 4 trash receptacles.

PHASE II

1. Add 50 parking spaces to the existing lot. Asphaltic concrete surface.
2. Park residence on backside of Ridge. Same specifications as previous residence if the Midgett House can not be used. In addition, the existing telephone and electrical lines will be placed underground.
3. 5 wooden picnic shelters (285 square feet) and 10 picnic tables with 2 trash receptacles.
4. Park visitor center — space for visitor orientation (570 sq. feet), naturalist office and laboratory (250 sq. feet), auditorium (1000 sq. feet), exhibit hall (1000 sq. feet), restrooms (2-165 sq. feet) facilities, and mechanical and storage space (500 sq. feet) shall be included in the building. Electrical and telephone service will be brought to building, and an 18,000 gal./day water supply is projected. Water line and accessories are needed, and septic tank and tile field is required for sewage disposal.

Electrical power and telephone service are available through the Virginia Electric and Power Company (Vepco), and Norfolk and Carolina Telephone and Telegraph Company respectively. All lines within the park property are to be placed underground, including the power lines that run behind the Ridge. Water service is available from the Town of Nags Head, and sewerage treatment will be provided by septic tank and tile drain field until the town can develop a sewage treatment plant.

PERSONNEL

Interim	Seasonal	Ranger II
	Seasonal	(2) 6 month attendants
	Seasonal	Part-time secretary
	Seasonal	Labor support
Phase I	Permanent	Superintendent I/Naturalist
	Permanent	Ranger II
	Seasonal	(1) 6 month attendant
	Seasonal	(1) 3 month attendant
	Seasonal	½ time clerk
	Seasonal	Naturalist
	Seasonal	Labor support
Phase II	Permanent	Superintendent II/Naturalist (up-graded)
	Permanent	Ranger I

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